The RUBBER AGE

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LATE NEWS of the Industry

New Excise Act Spurs Shipments of Tires Before Tax Becomes Effective—

Shipments Are Heaviest in Months—Price Lists Adjusted to Take Up Tax—Legislative Committee of Rubber Manufacturers' Association and Treasury Officials Determine on Regulations Regarding Tax

AS a direct result of the imposition of the new excise taxes on tires and tubes and rubber sporting goods, which officially went into effect on June 21, shipments from rubber manufacturers to dealers in time to escape the tax levy have been exceptionally heavy and sales in almost record volume have been reported. The application of the tax has also caused a readjustment in price lists on the part of practically all manufacturers and the new price schedules are now in the hands of dealers. Confusion in regards to the interpretation of various phases of the tax law have been largely smoothed out by the conferences held within the last two weeks between the officials of the Treasury Department and the legislative committee of the Rubber Manufacturers Association. A brief resumé of the regulations promulgated by the Treasury Department in connection with the collection of the tax, is printed elsewhere in this issue of THE RUBBER AGE.

An encouraging increase in the demand for tires and tubes, from wholesalers, distributors and dealers, was noted as soon as it became evident that tires would be taxed in some form. As a result, many of the tire factories, particularly in the Akron district, found it necessary to step up production schedules.

Companies with their own retail outlets made shipments by all available facilities. Some of the larger companies transferred inventories to retail sales points.

Sales are not only confined to dealers, but they in turn have reported a large increase in consumer purchases to escape the tax. A large Washington, D. C., distributor for the Fisk lines reported the demand for tires exceeding any ever known there as a result of the prospective tax and many firms with large trucking fleets are ordering tires in carload lots.

Kelly-Springfield Tire Co. advanced output at its Cumberland, Md., plant which is now operating 16 hours a day, seven days a week. On June 4, 17 carloads and eight truckloads of tires were shipped from the Cumberland plant, representing a total of about 17,000 tires. This is the largest daily shipment in the history of the company, the previous record daily total having been about 10,000 tires.

All departments of the Mansfield Tire and Rubber Co. swung into capacity production last week as a result of a 25 per cent increase in sales of tires and tubes, says George W. Stephens, president and general manager. Mansfield dispatches say the working schedule of three eight-hour shifts assure full time employment for more than 1,100 men, some of whom have been working only part time. Approximately 100 others have been called back after a layoff.

W. G. Klauss, president, the India Tire & Rubber Co., states that the working force of India was being increased 33⅓ per cent and the plant at Mogadore was being placed on six-hour shifts of seven days a week.

Special activity was conspicuous in the Cuyahoga Falls

Scanning the Headlines

New EXCISE LAW spurs shipments of tires and tubes to escape tax . . . May consumption of CRUDE RUBBER exceed April, but stocks on hand remain high . . . TIRE shipments in April jump 25 per cent . . . DUN'S survey of rubber industry paints gloomy picture . . . DUNLOP announces new "doughnut" tire after long hesitancy . . . JAPANESE plantation firms plan merger . . . "SINGATEX" roadway process demonstrated in Malaya . . . FIRESTONE refuses to increase tire prices . . . HENDERSON thinks rubber consumption will exceed output in 1932 . . . THIOKOL goes into quantity production . . . New government regulations regarding excise tax on tires, tubes and rubber sporting goods are announced by legislative committee of the Rubber Manufacturers' Association.

plant of the Master Tire and Rubber Corporation, which also operates factories in Findlay. Frank C. Millhoff, vice-president, declared that the Falls factory had shipped more tires and tubes in May than during any previous month in its history. "We are deluged with orders and have put to work every man we could accommodate," he said. "The same situation is true in Findlay where the Cooper corporation and the Giant Tire and Rubber Co. operate."

The Akron district has not experienced such activity in tire shipments for many months.

More truckloads of tires have been on their way out of Akron, and more carloads of tires on the rails than at any time for months, company reports agree.

Factory sidings throughout the city were filled with cars waiting for loaders. One trucking company, operating 200 units, was unable to meet the demands on its equipment.

R. D. Dorsett, manager of All-States Freight, Incorporated, trucking line that serves all the principal rubber factories, said that his company "was unable to handle the business offered."

"We moved more tires than we have ever handled. We have been forced to turn down business because we couldn't take it. Tires that under ordinary circumstances would never go by rail went aboard boxcars because we and other truckers were absolutely unable to move them."

Akron Rubber Group, A. C. S., Holds Annual Summer Outing and Dinner

ABOUT 180 members and guests attended the annual summer meeting of the Akron group of the Rubber Division, A. C. S., which was in the form of an outing at the Silver Lake Country Club, on June 13. The majority of those present played golf in the afternoon. Dinner was served at 7:30 o'clock after which 60 prizes were distributed by drawing lots.

The following rubber companies contributed prizes for the occasion: Mansfield, Johnson, Corduroy, Denman, Faultless, India, Seiberling Rubber, Seiberling Latex, General, Falls, Pharis, Goodrich, Ohio, Inland, RCA Rubber, Goodyear and Mohawk. Other business houses identified with the rubber industry in the Akron district, who also contributed, included the following: American Zinc Sales Company, E. H. Owens, Binney and Smith Company, New Jersey Zinc Company, Anaconda Zinc Oxide Company, Akron Standard Mold Company, National Rubber Machinery Company, Naugatuck Chemical Company, Wyandotte Oil and Fat Company and Russell Farley.

Consumption of Rubber Advanced In May, But Stocks Increase

CONSUMPTION of crude rubber by manufacturers in the United States for the month of May amounted to 29,197 long tons as compared with 25,953 long tons for April, 1932, and represents an increase of 12.5 per cent, according to statistics released by the Rubber Manufacturers Association.

This organization reports imports of crude rubber for the month of May to be 32,224 long tons, a decrease of 12.9 per cent below April, but were 1.6 per cent above May a year ago.

This Association estimates total domestic stocks of crude rubber on hand May 31, at 346,231 long tons, which compares with April 30 stocks of 343,098. May stocks show an increase of 1 per cent above April of this year and 56.8 per cent above the stocks of May 31, 1931.

The participants in the compilation report 50,453 long tons of crude rubber afloat for the United States ports on May 31 which compares with 40,387 long tons afloat on April 30, 1932, and 55,173 long tons afloat on May 31, 1931.

Tire Shipments During April Jump 25 Per Cent Above March Total

SHIPMENTS of pneumatic casings for the month of April amounted to 3,697,630 casings, an increase of 25.2 per cent over March this year, but were 25.0 per cent below April, 1913, according to statistics released by the Rubber Manufacturers Association, Inc.

This organization reports production of pneumatic casings for April to be 3,516,861 casings, a decrease of 4.2 per cent under March this year and 28.9 per cent below April, 1931.

Pneumatic casings on hand April 30 amounted to 9,845,820 units, a decrease of less than 1 per cent under March and 1.9 per cent below April 30, 1931.

The actual figures are as follows:

Pneumatic Casings

	Shipments	*Production*	*Inventory*
April, 1932	3,697,630	3,516,861	9,845,820
March, 1932	2,954,040	3,671,090	9,877,823
April, 1931	4,931,906	4,944,364	10,031,419

Dun's Sees Rubber Industry Undergoing Slow Readjustment, According to Survey

A SPECIAL survey of the rubber goods industry recently made by the research department of R. G. Dun and Company, calls attention to the heavy mortality rate in the industry over the last year and while painting a generally drab picture of the present situation, voices a note of optimism for the future. Several observations in the survey are worthy of quotation and are given below:

"The automobile tire industry often is regarded as one of the most reliable business barometers, since in the past it has forecast swings of general business activity with a fair degree of reliability. For several years, the more marked fluctuations of the tire industry have preceded similar movements of general business by many months. For example, a high reached early in 1923 in the tire business was followed several months later by a high in general business. Similarly, a low reached late in 1923 in the tire industry was not reflected in general business levels until the year following.

"The tire business declined below normal in the middle of 1929, and was nearly 20 per cent off by the end of the year, while it was almost the end of the year before general business indices slipped below the normal line, and nearly the end of the year following before they were 20 per cent off. In view of the accuracy of these previous forecasts, the fact that the index of the tire business today stands at a higher level than that of general business may be of interest to those who are watching for signs on which to predicate a resumption of general business activities.

"The tire industry, after two successive years of curtailed sales, still is running at better than 70 per cent of 1929 totals. There are few manufacturing businesses in the country which can display such an imposing record.

"Tire manufacturers are proceeding with caution and have not advanced their production schedules appreciably, as the decline in factory shipments still is unchecked. Inventories as of May 1 still are slightly below those of the same date in 1931, due to strenuous liquidation of inventories in the closing months of last year. With the recent substantial increase in manufacturers' stocks, however, producers are more or less feeling their way, with operations in most instances below 50 per cent of capacity.

"As a result of the mild Winter, the inventory of boots and shoes was high at the beginning of the year, but as manufacturing operations have been reduced, stocks held by retailers on March 1 were appreciably lower, 291 pairs per dealer contrasting with 299.5 pairs per dealer on March 1, 1931. The current trend of buying only for immediate

needs is revealed in the smaller percentage of dealers reporting stocks in each footwear classification, showing a narrowing of stocks more closely to the major demand of the individual community.

"The volume of credit business varies from one tire store to another, ranging all the way from 5 or 10 per cent to as high as 80 per cent in exceptional cases. Credit managers of retail tire stores expect to collect about 50 per cent of outstanding accounts each month. Of the total past due accounts, an analysis shows approximately this division: 3 per cent over 180 days old; 17 per cent, ninety to 180 days old; 30 per cent, sixty days old; and 50 per cent, thirty days old.

"The survey made of bad debt losses among manufacturers of tires and tubes and mechanical rubber goods during the first six months of 1931 showed the average for the industry to be .604 per cent. The average reached a high of .869 per cent among the 27 retailers to whom manufacturers sold merchandise valued at $11,165,000 during the six months' period. A low of .104 per cent was set down for the sales totalling $8,825,000 to 13 manufacturers.

"The mortality rate among manufacturers of rubber (exclusive of tires) was higher in 1931 than at any time in the last five years. The number of insolvencies was twice as large as in 1930, while the value of the liabilities showed a gain of $1,884,970. Among the retailers, the number of failures also increased, with the total value of liabilities gaining by $161,900. The complete insolvency record for the past five years of the rubber goods industry (exclusive of tires), as compiled by R. G. Dun & Co., shows:

Manufacturers

Year	Number	Liabilities
1927	4	$1,576,900
1928	6	238,200
1929	4	268,000
1930	4	67,200
1931	8	1,952,170

Wholesalers and Retailers

Year	Number	Liabilities
1927	11	$133,400
1928	9	95,000
1929	2	4,600
1930	4	50,000
1931	7	212,100

Rubber Cylinder Plating Barrel

AN all-rubber cylinder plating barrel is the latest device to be introduced to the electroplating industry by the Udylite Process Company, Detroit, Mich.

The single cylinder units are built in two main types, namely, the bail type having cylinder lifted from tank by means of overhead hoist and the lift arm type having cylinder lifted from tank with easily operated crank through a worm gear. Multiple unit machines, with any number of plating cylinders in one tank can also be furnished. The multiple unit machines are designed to supersede batteries of single plating barrels.

The selection of hard rubber as a suitable material was made as the result of conducting exhaustive experiments and service tests over a long period of time. The fact that hard rubber cylinders have been in operation in many plants under the most exacting conditions with remarkable results is also proof of the durability of this material.

Hard rubber is impervious to impregnation and can be cured so as to give great strength. The cylinder parts are designed to take full advantage of this and it is not necessary to use fabrics or other fibrous inserts in order to add to the general strength. If such inserts were necessary impregnation would occur and the life of the parts shortened.

Thiokol in Commercial Production

THIOKOL, the new chemical product which has many of the physical characteristics of rubber, yet has no rubber in its composition, is now being made in commercial quantities at the plant of the Thiokol Corporation, Yardville, N. J. The product has many advantages which may make possible important advances in the manufacture of certain rubber goods. A brief description of Thiokol was given in THE RUBBER AGE of December 10, 1930, at a time when the experimental work on the product was still going on.

Thiokol is a product of synthesis, differing widely in chemical composition from rubber. The product was developed to take the place of rubber under conditions where rubber will not stand up and is now being used as the raw base material in the manufacture of certain articles. It is made by the chemical interaction of ethylene dichloride ($C_2H_4Cl_2$) and sodium polysulfide (Na_2S_x). By analysis, it will show essentially 15.5 per cent carbon, 2.5 per cent hydrogen and 82 per cent sulphur. It is important to understand that the high sulphur content is not present as a mechanical mixture, but is in actual chemical combination with the other elements.

In Making Thiokol the Chemicals Are Mixed in a Large Vat and Washed With Water

In appearance Thiokol is homogenous, firm and dense, but pliable. It is opaque and pale yellow in color, and has a characteristic odor. It becomes somewhat plastic when heated, but it does not melt. There is no chemical deterioration over long periods. Even in its raw state it is insoluble in any of the usual solvents.

This procedure for putting raw Thiokol into saleable form is similar to the processing of rubber. Thiokol can be cured by mixing into it any one of a number of materials such as zinc oxide, and heating at a reasonably high temperature. Curing greatly improves strength, elongation, hardness and elasticity. The addition of various kinds of ingredients before curing makes it possible to obtain Thiokol compounds of varying sets of characteristics, which of course, widens its applicability.

It is claimed that Thiokol compounds do not age or perish in storage. Oxygen does not appear to affect Thiokol. Even the ozone generated during electrical corona tests does not cause degradation. Thiokol compounds exposed to sunlight do not show the surface checking.

Thiokol compounds can be made to unite with rubber during vulcanization. While Thiokol compounds are satisfactory at all usual atmospheric temperatures, they are ordinarily not recommended for temperatures above 170°F.

(Other news of the industry will be found on Pages 241-246)

Interpretations of the New Tax Law

A Paraphrase of the Treasury Department Regulations Covering the Excise Tax on Sales of Tires and Tubes and Rubber Sporting Goods by Manufacturers

AS a result of conferences in Washington between the Legislative Committee of the Rubber Manufacturers Association and officials of the Treasury Department, specific regulations have been determined upon by the Government in connection with the application of the Federal excise taxes on tires and tubes and rubber sporting goods. The following brief summary covers the more important details of the regulations proposed.

Paraphrase of Tax Regulations

Effective Date—"Tax imposed on articles, *sold, leased,* or *used,* by the manufacturer, producer or importer on and after June 21, 1932, though manufactured before that date."

Definition of "Manufacturer"—A manufacturer is one, who—

1. Actually makes article,
2. Produces taxable article by changing the form,
3. Produces same by combining two or more articles,
4. Causes a taxable article to be made from specially prepared plans and specifications or under patent of another.

Basis of Tax—"In general, this should be manufacturer's * * * price at factory or place of production. Includes charges incident to putting article in condition to ship; excludes amount of tax whether billed as separate item or not; also excludes transportation, delivery" and other charges not required by putting article in condition to be shipped to be included.

Tax attaches when title passes. Follows language of Regulations under 1926 Act. When consigned, tax attaches when sold by consignee. Article plus container ready for shipment used in computing the taxable price. Where container returned credit may be taken.

"Tax imposed on sale * * * is not a part of the sale price. If tax is included in sale price, amount of tax should be excluded in computing tax due regardless whether shown as separate item or not." Manufacturer may compute tax on sale price and bill exact amount of tax to his customer as separate item, but where not so billed, it will be presumed included in price charged for article.

Charges for transportation, delivery, etc., "shall have no connection whatever with the manufacturing processes or placing article in finished condition packed and ready for shipment; if billed and identified as separate items on invoice, are to be excluded in computing tax. Any additional charge which purchaser would not be required to pay if he accepted delivery at factory not included in computing taxable price.

On consignment sales manufacturer pays tax computed on price received by him from dealer.

Fair market value is price at which ordinarily sold at factory in absence of special agreements. Tax on retail sales computed on wholesale price where manufacturer customarily sells both at wholesale and retail, where more than one wholesale price average wholesale price used as to retail sales. In wholesale sales on actual selling price.

Use by manufacturer of taxable article is regarded as sale.

Exchanges—If articles sold are returned and the sale entirely rescinded by refunding the entire amount paid, including tax, no tax is payable on the transaction and, if paid, may be credited against the tax included in a subsequent monthly return.

If an article is sold under a guaranty as to its quality or service and is thereafter returned and a rebate made pursuant to the guaranty the manufacturer may claim as a credit against tax included in a subsequent return such portion of the tax originally paid in respect of the article as is proportionate to the amount of the price refunded.

Tires—"Includes all kinds of rubber casings, rubber hoops, rubber strips or bands designed to form tread of or to fit a wheel" * * * "either solid or pneumatic, irrespective of whether designed for use on wheels for automotive vehicles, carriages, bicycles, wheel chairs, wagons, hand trucks, children's toys or other articles."

Weight—Tax is to be "computed on total weight of a tire and tube * * * and fractional parts of a pound must be included." Manufacturer must be able to prove metal base reduction. Inner tubes weight includes weight of "air valve and stem, or any other mechanism attached thereto which may be used to inflate or retain inflation." Department is being urged to adopt average weights for each size and type on an industry basis.

Sporting Goods—The regulation sets out the specific items named in the bill and holds tax applicable "to all similar articles commonly or commercially known as sporting goods, games and parts of games * * * purpose of which is primarily for use either indoors or outdoors in connection with a game of sport."

"There are other articles used in sports or games which by reason of their general use for other purposes are not subject to tax unless sold as a part of a uniform. Among such are bathing suits * * * plain rubber soled shoes" * * * "Tax does not attach to children's toys and children's games." On the basis of the dictum in Winslow Skate Company vs. United States, probably a change in this article to exclude "from taxation children's toys, except such as are under the classification of games" will be made.

Returns—Returns are to be made monthly on or before the last day of the month following that for which return is made.

Sales for Export—Export sales are exempt if sold for export and exported in due course, and proof thereof is required to be had by manufacturer at time of sale.

For exemption it is necessary that (1) the article be sold for export and (2) it be exported in due course. (No particular form of exemption is prescribed).

Proof of Exportation—Exportation must be evidenced by:

1. A copy of the export bill of lading.
2. A certificate by the agent or representative of the export carrier showing actual exportation of the article.
3. A certificate of landing signed by a customs officer of the foreign country to which article is exported.
4. If no customs administration, a sworn statement of the foreign consignee covering receipt of the article.
5. Where purchaser and not the manufacturer is the exporter, an affidavit of the purchaser for export stating that article was in fact exported in due course prior to use, resale, or further manufacture within the United States and specifying the evidence referred to under 1, 2, 3 or 4 which he has in his possession covering exportation of the article and that such evidence is available for inspection by Government officers.

Exports to Possessions of the United States must be certified and proved the same as export routine.

The Effect of TEXTURE COMPRESSION *on the* TENSILE STRENGTH *of Standard Numbered Cotton Duck*

By JAMES R. CORLEY*

TECHNICIANS and designers of mechanical fabrics are progressing rapidly in the ability to construct these fabrics to render improved and longer life in service from a minimum mass of material through the efficient assembly of the fabrics' components. The practice of working an extra amount of material into the fabric as a safeguard against discrepancies of invisible variations and as a guarantee that the construction when produced will perform its service, is passing into the discard. It is being overcome by designers by progressive knowledge of the materials and by the industries in their unwillingness to assume the cost of excess material as a guarantee. The present day demand is enough material, no more or no less, efficiently assembled in the fabrics to render maximum service and length of life.

Compression of the texture is one of the features of importance in the design of a fabric when it is constructed with tensile strength as the objective. It is accepted that in most instances the degree of hardness of texture of a fabric greatly affects its tensile strength. The designer, however, is often puzzled by the difference in his predetermination of its effect and actual results from the finished fabric in service.

The following investigation is a systematic study of texture compression and its effect on the tensile strength of mechanical cotton duck. It was made by a carefully planned study of the details of standard fabrics. The information disclosed by the study of these details was employed in planning the details for the development of similar fabrics. The constructions of the plan were actually produced as a check on the study. Throughout the study, texture compression in addition to its effect on tensile strength, was also carefully observed for any other effects it might show on fabric resistance to service wear and its possibility for economic use in the construction of mechanical fabrics.

Selecting Fabrics for Investigation

Texture compression can be more readily investigated by using the heavier fabrics for the study, or those classified as Mechanical Ducks, because the heavy weight of these fabrics tends to reflect the results over a wider range of variation. From the numerous mechanicals, the group selected was that classified as numbered Cotton Duck by the U. S. Government Standard Specification No. 53. Among other reasons for the selection of this group was that they are standard with the industry. They are produced and used in great volume, which afforded the opportunity of compiling working averages from a wide range of data as a foundation for the investigation and study.

The weights of the fabrics of this group are based on a definite system of progressiveness from the lighter to the heavier fabrics. They range in weight from 11.45 to 49 ounces per square yard (7 to 30 ounces per linear yard 22 inches wide). The system of numbering the fabrics is based on the following computation—Number of duck—19—weight in ounces per linear yard 22 inches wide. Example: No. 1 duck = 19-18. When the weight per linear yard 22 inches wide exceeds 19 ounces, the number of duck is indicated as follows: 19 ounces is 1/o — 20 ounces 2/o, etc.

Their textures are classified by the industry as hard, medium and soft, according to the number of filling threads per inch; the hard texture having a greater number per inch than the medium; and the medium a greater number per inch than the soft.

The hard texture class was selected because of its prevailing popularity with the trade and that there are fourteen different weights and constructions for tests and study, ranging in weight from 11.45 to 32.72 ounces per square yard. Numbered duck is defined as a Mechanical Fabric, plain weave, made from heavy plied yarns, by Technological Paper of the Bureau of Standards, No. 264, "Development of the Standard Numbered Cotton Duck Specifications."[1]

Details for the manufacture of these fabrics for Government uses are covered by the U. S. Government Standard Specification No. 53 for Numbered Cotton Duck. They have been manufactured to comply with the requirements of this specification since its official adoption Feb. 1st, 1932. This afforded the opportunity of following test results of the fabrics over a period of years giving a wide range of tests from which the averages were compiled. All tests used in the study were made as prescribed by Specification No. 53, and all samples used were within the range of allowances for the various details as specified.

The final reason for this study resulted from Technological Paper of the Bureau of Standards, No. 264, the report of the investigation carried on by the Bureau of Standards in co-operation with the Cotton Duck Association, from which Specification No. 53 was drafted. Referring to Fig. 1, which is a copy of Table 1, Specification No. 53, there is a uniform difference in the strength specified for the respective numbers of duck. This difference of strength is in direct relation to the difference in weight of the numbers. The strength of the various weights of duck is derived by the strength weight factor 27.5 for hard texture duck. This factor is obtained by dividing the sum of the warp and filling breaking strength by the weight of the material in ounces per square yard.

$$\frac{\text{(Breaking Strength Warp)} + \text{(Breaking Strength Filling)}}{\text{Weight in ounces per square yard}} = \text{Strength Weight Factor}$$

Numbered duck is manufactured on a definite system of using the ply of the yarns and the thread-count to obtain the weight of the respective numbers, and the texture has been classified as hard, medium and soft. The resulting strength or the strength weight factor should remain unchanged for the different weights of ducks of the same class of texture.

Preparation of Construction and Strength Details

Average strength figures compiled from tests of numerous sam-

*Fabric Engineer, 254 W. Newton street, Boston, Mass.

[1]May be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C.

ples of numbered duck, show that all numbers meet the specified minimum strength of Fig. 1, but that difference in strength between the respective numbers is not in the same uniform proportion as the difference in the weight of the respective numbers; that the strength weight factor does change for some of the weights of duck. The textures specified by Fig. 1 were analyzed for changes in comparison with changes of the weight and strength of each of the fabrics as shown by Plate 1—the graphic plot of the comparative analysis of construction weight and strength details of Fig. 1. Four plots are shown by Plate 1. Since the strength weight factor is based on the sum of the warp and filling strength, or the aggregate

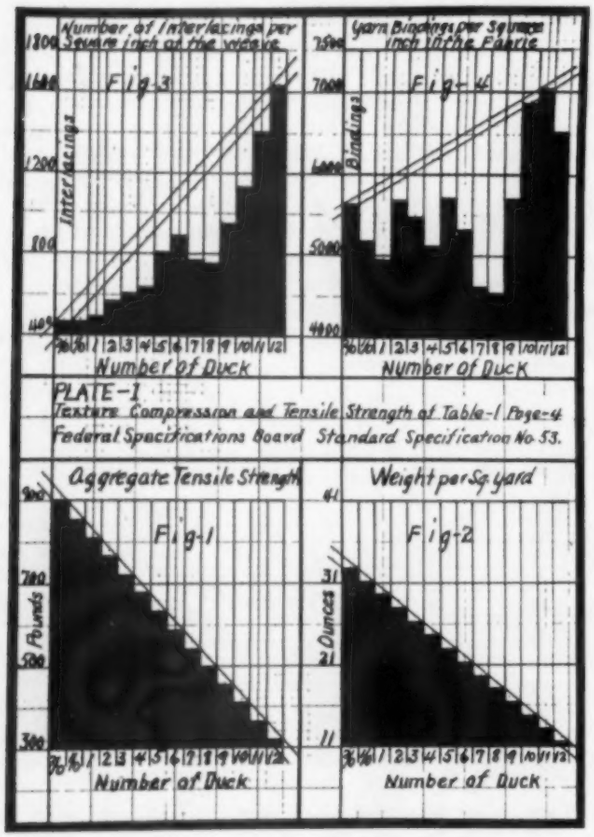


PLATE 1

strength of the fabric, and texture compression is a unit force or support of warp and filling acting in co-ordination, therefore each feature of Plate 1 is considered as a unit. The units can be easily distributed as desired between warp and filling within reasonable ranges without seriously disturbing or affecting the respective unit force.

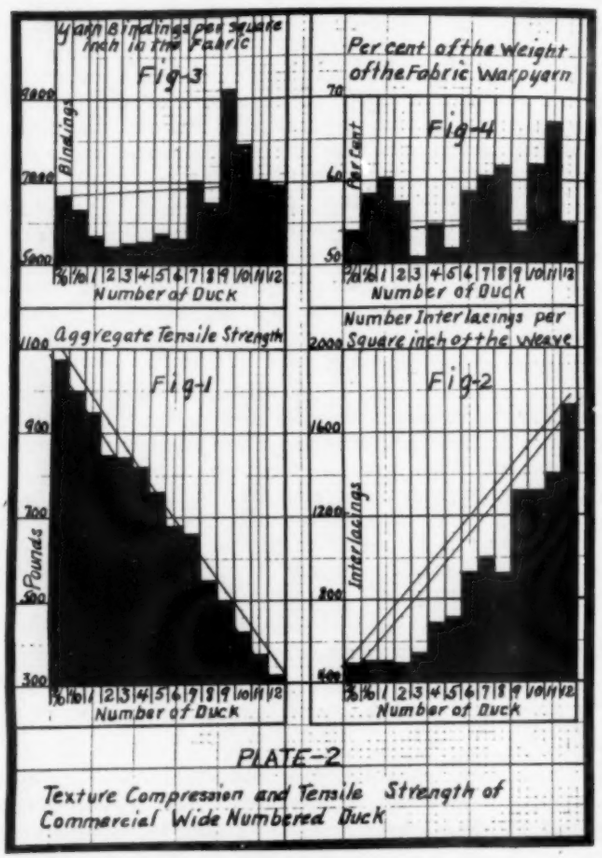
Fig. 1 of Plate 1 is the aggregate tensile strength showing the uniform proportioning between the fabrics. Fig. 2, the weight of the respective numbers in ounces per square yard, showing a uniform change between numbers of the duck, from which the uniform strengths of Fig. 1 are to be expected for the same class of texture. Fig. 3 is the interlacings per square inch in the weave of the fabric or the product of the number of warp and filling threads per square inch of the fabric, as 2/o duck Fig. 1 counts 26 sley by 18 picks interlacings per square inch = 26 x 18. This figure shows the progressive relationship of interlacings per square inch for each number of duck. They are inconsistent compared with weight relationship of Fig. 2. The number of bindings of the yarns in a square inch of the weave is shown by Fig. 4. This item is the product of the interlacings per square inch multiplied by the sum of the plies of the warp and filling yarn. 2/o duck counts—26 x 18 with 5 ply warp and 7 ply filling. No. of yarn bindings per square inch = 26 x 18 (5 + 7). The relationship of this item compared with the weight of the respective numbers also is not uniformly proportioned.

Plate 2 is actual averages of the results from tests of samples of numbered ducks and the investigation and study of their average textures over a long period of time. This plate compared with Plate 1, item for item, shows all of the features to meet specified requirements for these respective details, but that the strength of Fig. 1 is not uniformly distributed between the respective fabrics in the same uniform proportion of their weights. Figs. 2 and 3 likewise are not in progressive relation as compared with the weights of the respective numbers of the duck. Along with the strength and texture it is necessary here to consider Fig. 4 in this study. This shows the per cent of the weight of the fabric composed of warp yarn, and a variation of this feature of from 50½ per cent warp for No. 3 duck, to 67½ per cent warp for No. 11 duck, is wide enough to affect strength.

Analyses of Data

The graphic analyses of the texture shown by Plates 1 and 2 disclose that even though the ducks are all classified as hard texture, there is enough difference between the textures of the respective numbers of duck to affect the strength weight factor.

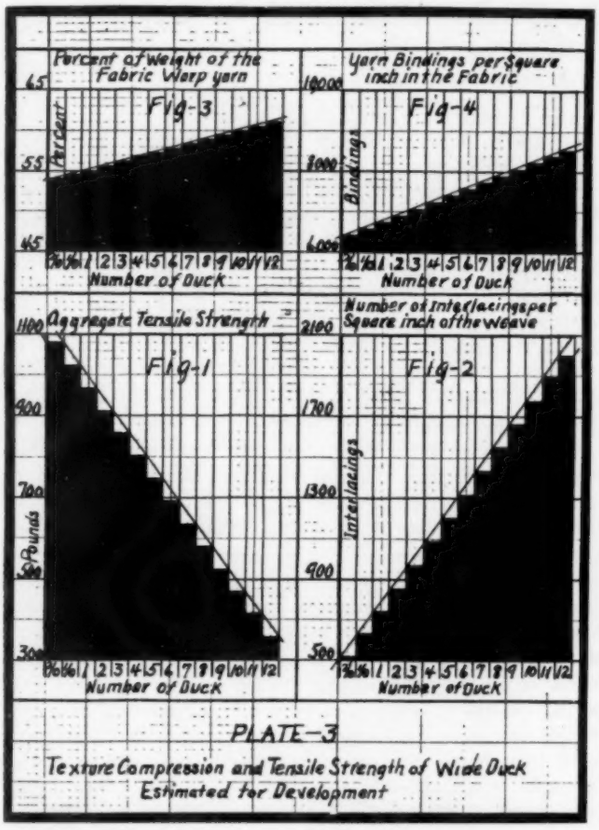
The tensile strength of a fabric is its quality to resist structure breakage by slippage or separation of the fibres within the yarns under applied strain. The rupture of a fabric specimen when broken by a standard method of testing tensile strength is the result of enough force applied to cause slippage or parting of the fibres



within the yarns, and not the result of fibre breakage in the fabric. This resisting quality or force is built up within the fabric by the compressive forces binding the individual fibres in place within the yarn diameter through the weight of the fabric, the structure and twist of the yarns and the number of interlacings per square inch in the weave.

The texture analysis of Plates 1 and 2 indicate that the compressive force of resistance has two divisions—compression by weight or bulk mass of material to form the fabric. The manner of assembly covers longitudinal binding of the fibres in a cross section of the yarn by twist of the single yarn and the number of doublings of the yarn by plies of singles and the binding of the laminations in

a cross section of yarn diameter by ply twist. In addition to this binding of the fibres by yarn structure, there is the interlocking effect of the yarns by the interlacings of the weave. A variation of the number of interlacings of the weave will have a much greater reaction on tensile strength through texture compression than a proportionate variation of the yarn structure. The effect of the interlacings of the weave may be considered from the viewpoint of making a tensile strength test of a warp specimen of a fabric. In this case the machine load applied to make the rupture, acts in the same direction that the fibres are laid in the warp yarn resulting in slippage of the fibres to cause the rupture. From this it is seen that each interlacing of the warp thread with the filling threads builds up a resistance at right angles to the direction of separation of the fibres under strain. This produces the effect of locking the fibres in the yarn. The more interlacings per inch in the weave per staple length of the fibre, the greater becomes lateral force of fibre resistance to rupture. Compression of texture accounts for the fact that two fabrics of the same weight but different yarn structure and number of interlacing threads in the weave, will show different tensile strength results. The fabric having the greater compression of texture will likewise have the greater strength. This may be illustrated by referring to Plate 2 and comparing strength and texture Figs. 1, 2 and 3, for No. 2 and No. 3 duck. This comparison shows difference of strength Fig. 1 to be slight in proportion to difference in weight. The comparative difference of texture compression shown by Figs. 2 and 3 is likewise slight as compared with difference of weight.


Percent of Weight of the Fabric Warp yarn
Fig-3
Yarn Bindings per Square inch in the Fabric
Fig-4
Aggregate Tensile Strength
Fig-1
Number of Interlacings per Square inch of the Weave
Fig-2
Number of Duck
PLATE-3
Texture Compression and Tensile Strength of Wide Duck Estimated for Development

Method of Designing the Development

Referring to the details shown in the figures of Plates 1 and 2, the general trend of the direction of the texture plots Figs. 3 and 4, Plate 1, and Figs. 2 and 3, Plate 2, is upward as the respective strengths and weights trend downward.

A plan of textures for ducks from No. 2/o to 12 inclusive, for development, was designed from the trend of the texture plots of the above plates to test the effect of compression on the tensile strength of the various numbers of duck in relation to their weight change by building up pressure to compensate loss of fibre bindings in the yarn as the weights of the respective numbers decrease from No. 2/o to 12 duck. When making the texture plots of Plate 3, it was desirable to increase the aggregate strength of No. 12 somewhat by texture compression so as to increase the margin of safety between actual strength test average and the specified strength. Therefore the texture high or starting point for the curves was raised as compared with the respective figures of Plate 2. No. 2/o duck was satisfactory in this respect, so that the low starting points of the texture plots of Plate 3 remained the same as those of Figs. 2 and 4, Plate 2. These two points when connected, Figs. 2 and 4, Plate 3, give the textures in the same proportionate relationship between respective numbers as that of weight. The desired strength is obtained by compensating the decrease of weight between numbers of duck, through increased compression of the texture by an increase in number bindings of fibres, in place within the fabrics.

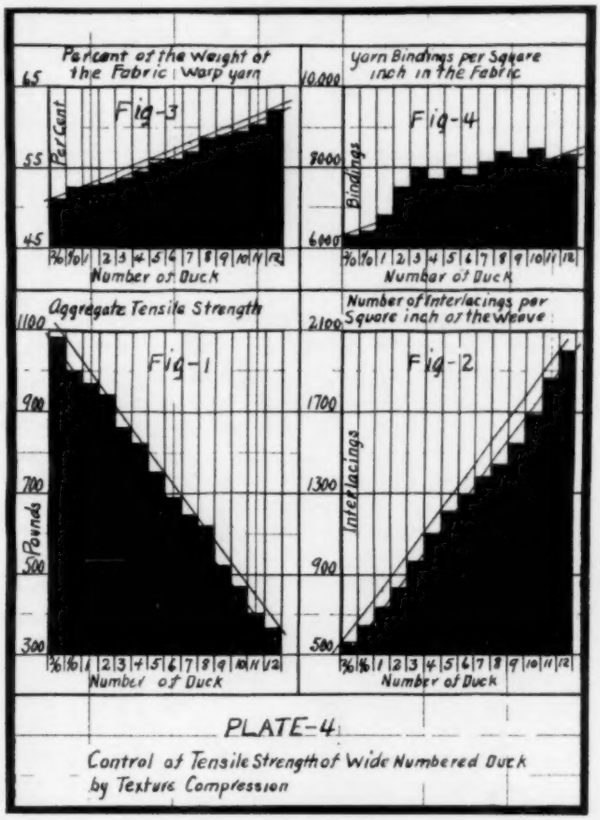

Percent of the Weight of the Fabric Warp yarn
Fig-3
Yarn Bindings per Square inch in the Fabric
Fig-4
Aggregate Tensile Strength
Fig-1
Number of Interlacings per Square inch of the Weave
Fig-2
Number of Duck
PLATE-4
Control of Tensile Strength of Wide Numbered Duck by Texture Compression

Fig. 3, Plate 3, shows the gradual proportion of weight of the fabrics between warp and filling, so that warp and filling strength of the respective ducks would uniformly comply with the strength as specified for each of these elements. Furthermore, that the distribution of twist and take-up in weaving of the warp and filling would be in uniform progression to give the least effect on texture compression by distribution of warp and filling weight in the fabric.

Construction details for the manufacture of the samples were from Plate 3, by reversing the calculations used to derive figures for the plots of the respective plates. The details derived for 2/o duck, Plate 3, Fig. 2, 507 interlacings per square inch, Fig. 1, Table 1, specification requires a warp count of 26 sley, thus establishing the warp count. To obtain the filling count $= \frac{507}{26}$ or 19½ picks per inch. The interlacings transposed in the terms of thread count is 26 x 19½. Fig. 4, Plate 3—6575 yarn bindings per square inch transposed into yarn plies— $\frac{6575}{507} = 13$ ply yarn to be distributed between warp and filling yarn. The specified minimum ply for the warp and filling Fig. 1, Table 1, is 5 x 7.

In order to balance the yarns, the 13 ply is proportioned 6 ply for the warp and 7 ply for the filling. The construction is now 2/o

No. of Duck	Weight: Per Lin. yard 22 in. wide *Ounces*	Weight: Per Sq. Yd. *Ounces*	Width *Inches*	Distance of Selvage Stripe from Edge	Minimum Ply: Warp	Minimum Ply: Filling	Minimum Thread Count per Lin. inch: Warp	Minimum Thread Count per Lin. inch: Filling	Breaking Strength 1x1x3 in. grab: Warp *Lbs.*	Breaking Strength 1x1x3 in. grab: Filling *Lbs.*
Hard Texture										
2/o	20	32.72	As specified	2	5	7	26	18	465	435
1/o	19	31.09	do	2	5	6	26	18	450	405
1	18	29.45	do	1¾	5	5	26	19	440	370
2	17	27.82	do	1¾	5	5	27	21	420	345
3	16	26.18	do	1½	4	5	29	21	390	330
4	15	24.54	do	1½	4	4	29	22	375	300
5	14	22.90	do	1½	3	4	34	24	345	285
6	13	21.27	do	1¼	3	3	34	26	335	250
7	12	19.63	do	1¼	3	3	35	22	300	240
8	11	18.00	do	1⅛	3	3	33	23	285	210
9	10	16.36	do	1	3	3	38	25	255	195
10	9	14.72	do	1	3	3	44	26	245	160
11	8	13.08	do	1	3	2	44	32	235	125
12	7	11.45	do	1	2	2	48	34	195	120
					3	2	40	34		
Medium Texture										
2	20	32.72	do	2	5	8	26	16	450	405
1	18	29.45	do	1¾	5	5	26	17	425	345
1	18	29.45	do	1¾	1	5	26	17	425	345
2	17	27.82	do	1¾	5	5	26	16	410	320
3	16	26.18	do	1½	4	5	26	17	370	315
4	15	24.54	do	1½	4	4	28	19	350	290
5	14	22.90	do	1½	3	4	28	20	315	285
6	13	21.27	do	1¼	3	3	34	20	305	250

FIG. 1—Table of Construction, Weight and Strength.

duck, weighing 20 ounces per square yard, counting 26 x 19½, with 6 ply warp and 7 ply filling yarn. Fig. 3, Plate 3, shows that the weight of warp in the fabric is to be 54 per cent of the weight of the fabric. Weight of 2/o is 20 ounces per square yard, proportioned 54 per cent warp = 10.8 ounces of the fabric warp and 9.2 ounces filling. These weights are calculated into single yarn numbers by the usual method of computing yarn numbers for a fabric.

Development and Results of Investigation

The proof of the effect of texture compression on tensile strength by actually producing samples from the textures plotted on Plate 3 was confronted with the decision of whether or not to conduct the experiment on purely a laboratory basis, using specially prepared single yarn numbers of special single and plied twists in an effort to increase fibre bindings in the fabrics, or to proceed on a production basis, using yarns and twist from the standard setup for regular numbered duck. The customary single yarn setup for these fabrics is single yarns ranging from No. 6's to No. 14's, inclusive, spun with warp twist, assembled in plies and thread counts necessary to make the weights of the respective numbers of duck.

Since the study and investigation dealt with standard production it was decided to follow standard procedure with a minimum disturbance of plant production program, and use single yarns and twists already in production. In designing these fabrics for maximum fabric strength high textures like weight had to be maintained in a constant relationship to the weight of the fabric. This was done by selecting finer single yarn numbers from the standard setup and increasing fibre bindings by use of greater number of plies and increased thread count in the fabric. Regular numbered ducks are made by trending toward coarser single yarn numbers and varying the texture to make the weights; whereas for this development, texture was maintained and weight made by use of finer single yarn numbers instead.

Figs. 2, 3 and 4 of Plate 4 show textures used for making the samples, which were the nearest possible approach to corresponding figures of Plate 3. One sample of each texture was made for testing purposes, and all tests were carried out in accordance with the details of Federal Specification No. 53. Figure 1 is the resultant tensile strength obtained from the tests. Comparing the results shown by Figure 1, Plate 4, with results of Figure 1, Plate 2, it is to be remembered that Plate 2 is the average result of tests of numerous samples and representative of production; whereas Plate 4 is the result of the test of a single sample and might vary somewhat from an average of production tested over a like period of time and a corresponding number of tests. Considering the tests of the group collectively of Figure 1, the results show a favorable indication of the effect of texture compression on the strength, and a better proportioned strength between the numbers of the duck than of Plate 2.

Discussion of the Investigation

It is mentioned above that the results of Figure 1, Plate 4, show favorable indication of the effect of texture compression on tensile strength, by a mere uniform proportioning of strength in relation to the weight of a numbers of the duck. This deduction is supported by a study of texture and strength on a comparative weight basis and comparative average results from kindred classes of mechanical ducks collected and averaged from tests of numerous samples over quite a period of time. The results in the terms of yarn bindings, and strength weight factor, are as follows:

Class of Duck	*Yarn Bindings Per Sq. Inch*	*Strength Weight Factor*
Regular Hose Duck.....	2800	24.00
Chafer Duck, ⅞ to 1" Cotton.....	5033	29.60
Numbered Duck	7425	31.80

The above figures represent the grouped averages of three fabrics from each class of duck ranging within the weight limits of from 10.2 to 18 ounces per square yard. These results indicate definitely that strength can be raised or lowered for fabrics of the same weight by an increase or decrease, in the same order, of compression of the weave and structure of the yarns.

This investigation was primarily aimed to be a study of effect of texture compression on tensile strength of numbered duck, having in mind its value as an instrument for use in designing mechanical fabrics to meet definite strength needs. A further consideration of the details shows it has a very great influence on surface wear of fabrics, or the quality to resist disintegration uses. In such cases, where structure breakage is caused by surface wear, the breakage usually begins by fibre displacement within the fabric. Resistance to this type of structure breakage can be built up by the use of a fabric of higher texture compression. The fabric with the higher compression presents a smoother surface to wear, with yarns and fibres more securely bound in place as the resistive feature. Texture compression also has a good economic possibility that may be employed in the design of lighter weight fabrics to replace heavier ones in service, in addition to its use to increase and improve the strength and service wear quality of mechanical fabrics. Thus it is shown that the compression of a fabric's texture is an important feature to be considered in the selection of a mechanical fabric for industrial service, because of its effect on fabric service and its economic value.

Specific Gravity Determination

ONE of the simplest methods of controlling the production of a rubber factory uniform is to determine the specific gravity of each batch of compound mixed. This may be very quickly and economically accomplished by dropping a cured disc of rubber compound successively into a chemical solution two points below the theoretical specific gravity of the compound, and then into another two points above the theoretical gravity. If the sample sinks in the low gravity solution and floats in the high, the compound is commercially OK. (R. R. Olin Laboratories, Akron, O.)

ZINC OXIDES

Part II — The Effect of Variations in the Properties of Zinc Oxide on its Action in Rubber

By G. S. HASLAM
New Jersey Zinc Company

THE function of a rubber laboratory in an organization such as ours is twofold; first, the maintenance of uniformity and quality of the product, and secondly, as a guide in the development of pigments such as have just been described. We recognize the vagaries of rubber testing and realize that the tests herein described and discussed are necessarily only indications of what might be expected in the factory and in the final product when these pigments are used. The curves we have drawn are based on average values rather than on any one specific set of data and represent a thorough background of experiments in a large number of formulations.

In the control work it is possible to maintain a certain degree of uniformity by means of chemical analysis and once the importance of some chemical constituent of the oxide is established it becomes part of the specification for that pigment. In the case of particle size a very satisfactory control can be maintained by the use of the Stutz-Pfund turbidimeter which has been described elsewhere and by the use of the microscope which offers an opportunity to study particle shape as well as particle size.

The ultimate test of the suitability of a pigment, however, rests on its behavior in a rubber compound, the formula of which at least approximates that compound in which it will be used. We intend to discuss the five oxides in the light of some of the more routine laboratory control tests which are applied in the case of pigment development problems.

Rate of Cure

It will be impossible to discuss the behavior of these oxides with all accelerators, or combinations thereof, so we have selected three of the more common ones; namely, Captax, 808, and D.P.G. It is not our intention to discuss the relative merits of compounds containing fast and slow curing oxides but rather to point out that it is possible, by controlling the manufacturing process, to cover a considerable range in rate of cure. Other factors being equal, we find that the finer the particle size, the faster the rate of cure at least within the range of the pigments under discussion. This may be due to the possibility that extremely fine subdivision of the zinc oxide causes the pigment to act as an accelerator and brings about an increase in rate of cure. We recognize that pigments, such as carbon black and zinc oxide, when used in high volume loadings, should cause as little variation in the rate of cure as possible so as to permit some latitude in compounding practice without affecting cure characteristics. No pigment has been found entirely satisfactory in this respect, but close approximations have been made.

Pigments A, B, and C, are generally considered as fast curing, while D and E are slow curing oxides.

Figure I shows the time tensile curves for the zinc oxides under consideration using Captax as the accelerator. Here the sharp increase in tensile for the fast curing oxides is seen, and the relationship between oxides which vary only in particle size is indicated by

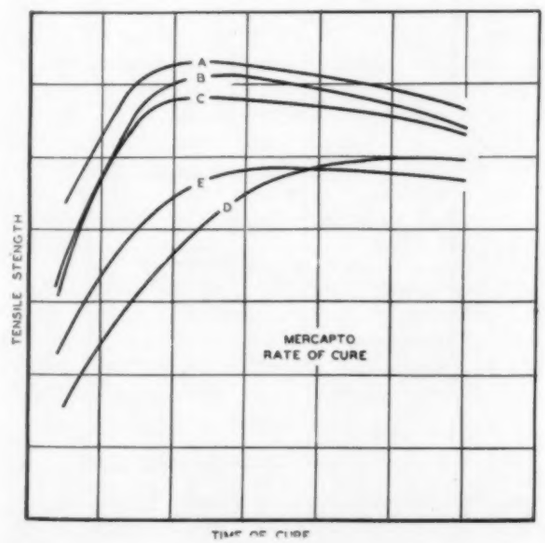


Figure I

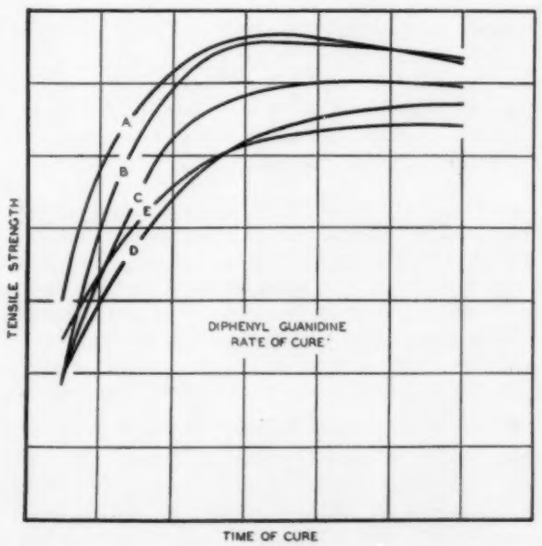


Figure II

the position of curves for zinc oxides A, B, and C; A being the finest and C, the coarsest.

In the case of the slow curing zinc oxides, D and E, this particle size—rate of cure relationship is affected by the presence of sulfur compounds which cause retardation of cure and whose influence on rate of cure is greater than particle size. Consequently, zinc oxide E, which contains lesser amounts of the sulfur compounds, has a coarser particle size and faster rate of cure than

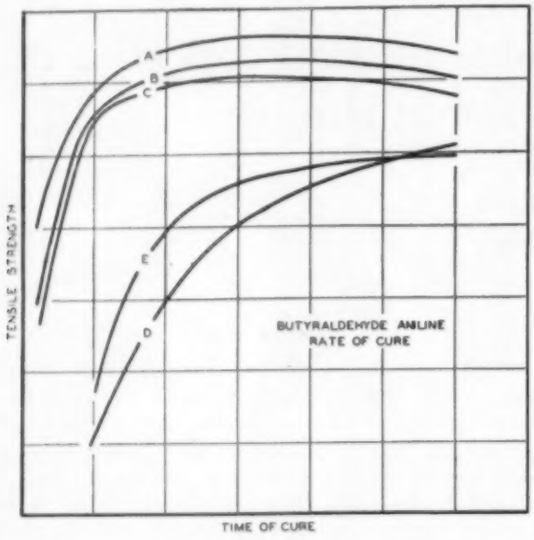


Figure III

zinc oxide D. The slow curing oxides also have a longer period during which the tensile remains at or near the optimum.

These factors, particle size and chemical analysis, are both controllable and can be varied independently in such a way as to permit a very considerable range in rate of cure.

D.P.G. has been used in Figure II, and the curves show the same general relationships they did with mercapto, although the differences are not quite so marked.

In Figure III, 808 has been used and we find that the differences between fast and slow curing oxides are even more pronounced than they were in the two preceding sets of curves. The presence of the sulphur compounds in oxides such as those represented by D and E make them unsatisfactory for use with accelerators of an extremely alkaline nature.

Modifications of zinc oxides A, B, and C, containing a relatively large amount of litharge have received considerable study, and with mercapto have shown a decided increase in rate of cure. This is unquestionably due to the secondary activating and accelerating action of the litharge which serves to step up the cure. With accelerators such as D.P.G. and 808, little or no effect has been noted. On the other hand, with accelerators such as the thiurams, it is essentially impossible to use an oxide of high lead content if a low temperature cure is to be used.

Activation

The use of zinc oxide in activating amounts reduces to a minimum the effect of the variation in zinc oxides which have been discussed and while there is some indication that the finer oxides such as A and B give better activation, it is probably due to the fact, previously mentioned, that zinc oxide in the finer state of subdivision serves as an accelerator so that actually what is being done is to increase the accelerator content of the compound.

Aging

Perhaps one of the more important functions of zinc oxide in a compound is to improve its aging characteristics. The accompanying curves, Figure IV, show the effect of varying amounts of several zinc oxides and show rather conclusively that the larger amounts are superior to the smaller amounts in this respect. It has also been established that those zinc oxides which give the plateau effect in the rate of cure curve show superior aging properties. Since overcuring and aging are associated with reversion, those oxides which maintain their maximum tensile with overcuring appear desirable.

Reinforcement

Zinc oxide, in addition to being a chemical compound entering into the reaction during cure, is a pigment of definite reinforcing properties. These properties are a function of both the particle size and shape, and the nature of the surface in so far as it affects the compound and the dispersion of the pigment therein. We have listed below several of the more important reinforcing properties which show the merits of the finer oxides and which could be discussed at length if time permitted.

In Table I, we have shown some of the results obtained on the five oxides under consideration, and desire to point out particularly the variation in abrasion resistance, tensile properties and modulus.

Table I

ZnO	Abrasion	Ultimate Tensile	Load at 300%	Load at 450%	Work of Extension
A	210	3960	640	1660	730
B	170	3890	685	1685	720
C	100	3780	655	1670	695
D	115	3800	860	1900	705
E	95	3840	690	1630	670

It is often easier to visualize the significance of data of this type when curves are drawn and when samples representing the extremes of the variable factor are included. With this in mind we have taken the liberty of adding several samples to our list and are showing in Figure V the relation between particle size and abrasion resistance and the effect of particle size on tensile strength.

In the past, the general belief seems to have been that in so far as heat generation and heat conductivity in rubber compounds are concerned all zinc oxides were essentially alike. More recently, however, the opinion has been gaining that important differences in this respect do exist and that zinc oxides which have high reinforcing properties will cause relatively high heat generation. Unfortunately the converse of this also appears to be true and a very definite sacrifice in abrasion resistance and tensile strength

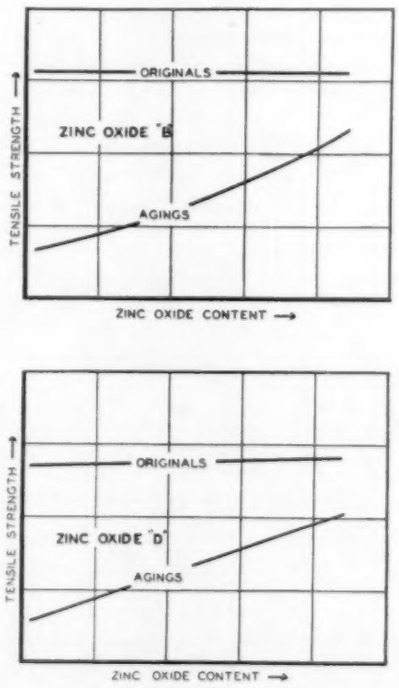


Figure IV

must be made if exceptional heat resistance is required. It is true, however, that any zinc oxide will give better heat conductivity and lower heat generation than other pigments of the same reinforcing value. Exceptionally good results in tests which depend on low heat generation, high heat conductivity and good heat resistance are obtained with zinc oxides C and E.

Retracing our steps to that group of oxides referred to in the first part of this discussion, in which the nature of the surface has

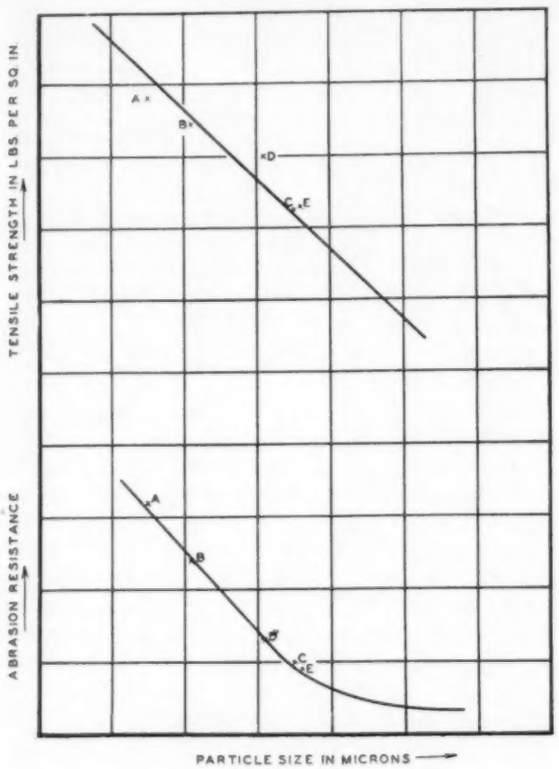


Figure V

been altered by the addition of some material that will improve its adaptability to rubber compounding, we find the effects on physical properties very nearly negligible. Since fatty acid, the most generally used material for this treatment, is always present in rubber in small amounts, and since stearic acid is so widely used in compounding, the use of the extremely small amounts, necessary for this treatment, does not affect the rate of cure and reinforcing properties. Small differences in tensile strength and modulus occur, which are of the same order of magnitude as would occur were the fatty acid added to the compound on the mill, rather than on the surface of the zinc oxide. The differences in ease of incorporation and degree of dispersion in Banbury testing obtained with this type of oxide are quite large, however.

This brief summary of the effects of some of the variables obtainable in zinc oxide on the testing of rubber compounded therewith will be further amplified in the third section of the discussion which follows.

(Part III on "The Practical Significance of Variations in the Properties of Zinc Oxides on the Performance of Rubber Compounds in Processing and in Actual Use" will appear in the next issue—Editor.)

The Firestone Penetrometer

THE Firestone Penetrometer is now being offered to the industry by the American Instrument Company, Washington, D. C.

This instrument is principally designed for use in the control of processing, for determining the change of hardness with age and for any purpose where an accurate, comparative test of hardness is desired.

As constructed, the instrument measures the hardness of specimens from one quarter inch to eight inches thick. In calibrating the Firestone penetrometer, the weights of all moving parts which may effect the reading have been meas-

Firestone Penetrometer

ured and allowed for; the spring is made relatively long so that the change in load between minimum and maximum penetration is small.

The standard Firestone penetrometer is equipped with a spring which exerts a pressure of three pounds on the point. This spring will give readings on a wide range of specimens. Extremely soft or hard materials can be accommodated by the use of lighter or heavier springs.

Another practical use for the Firestone penetrometer is the comparison of penetration of rubber with stress at a given elongation.

Sulfoloid and Zincoloid

COLLOIDAL forms of sulphur and zinc oxide, dispersed in the form of pastes containing about 60% solids, called Sulfoloid and Zincoloid respectively, have been announced by the Mimex Co., Inc., Long Island City, New York. The manufacturers state that the particles of sulphur and zinc oxide, in the colloidal forms of these materials, exist singly in permanent suspension, thus greatly increasing the surface factor of the materials and facilitating their activity as activators or vulcanizing agents.

As a filler in latex, in the manufacture of crepe rubber and artificial leather and in the impregnation and coating of textiles, Sulfoloid and Zincoloid are said to possess many unique advantages.

M-O-D-X

A NEW material called M-O-D-X has just been introduced by the C. P. Hall Company, Akron, Ohio, to fill a need for a toughener and making cures more uniform. M-O-D-X is a light colored (cream) solid having a specific gravity of approximately 1.34. It softens and melts at milling temperature and disperses readily in the rubber batch.

When used in combination with Phenex it has the property of causing different lots of rubber to cure uniformly. When used in combination with most of the common accelerators M-O-D-X has the property of toughening the rubber, resulting in higher modulus and consequently improving the resistance to flexing and abrasion. Furthermore, on account of its activating properties the use of M-O-D-X is said to result in accelerator savings.

EDITORIAL COMMENT

"Nuisance Levies"

THE application of the new excise taxes will entail a mass of intricate detail and clerical labor on the rubber companies manufacturing goods covered by the act. More detailed accounts will be necessary, elaborate records must be kept, cost figures will have a new significance and a multitude of new angles in production schedules will have to be worked out.

It is not the time to hold any brief for the new taxes. The government, of necessity, needs money, but in the method of application the new taxes have been justly termed by the *Journal of Commerce* as "nuisance levies." The actual cost to the manufacturers in the extra clerical recording now made necessary under the law, will prove to be no small item.

What appeared to be a simple "manufacturers' sales tax" has turned out to be an intricate excise levy, full of ambiguous provisions and subject to difficult interpretation.

A committee of the Rubber Manufacturers' Association has endeavored to iron out the many possible interpretations of the law in cooperation with the officials of the Treasury Department at Washington, but the results of their official determinations constitute a case for the proverbial Philadelphia lawyer. The records and evidence required in export shipments necessary to secure an exemption from the tax, for instance, are sufficient to burden every large rubber company with an addition of one or more clerks. Records on returned goods and consignments constitute another difficult problem to the manufacturer if he expects an exemption from the taxes.

The clause referring to sporting goods made wholly or in part of rubber is decidedly indefinite and must be further interpreted by the government.

The act provides that the tax on tires and inner tubes shall be computed on the weight of these articles excluding (in the case of solid truck tires) the weight of the metal rim or rim base. In determining the weight of the tires and inner tubes, the flap, packing and wrapping are excluded. It is believed by the legislative committee of the Rubber Manufacturers Association that there are obvious advantages in having the weight of tires determined on a fixed basis by the Department for all makes of tires rather than computing the tax on the individual weights of each tire.

The legislative committee of the Rubber Manufacturers' Association is endeavoring to make it as easy as possible for the industry, but many points of the law have yet to be smoothed out. In the meantime the industry must grin and bear it and assume a patriotic stand by changing its slogan of 1918 of "Rubber will help to win the War" to "Rubber may help to balance the Budget."

Trade Associations in Depressions

AMERICAN industrial concerns, which have come to rely so heavily upon their trade associations in normal times, find that in periods of depression the services of their associations are even more indispensible.

This is indicated by a survey of trade association membership and income changes just completed by the Trade Association Department of the Chamber of Commerce of the United States. The survey reveals a general condition of strength among trade organizations. As compared with much larger percentage declines in most lines of industry, the trade associations included in the survey reported only an average falling off of about 6 per cent in membership and a decline of a little more than 10 per cent in income in 1931 as compared with 1930.

One hundred ninety-eight associations reported a total income in 1931 of $10,541,524, a decrease of $1,260,747 from 1930. Membership totaling 132,933 concerns was reported as of January, 1932, a drop of 8,884 as compared with the year before.

This healthy condition of the trade association movement speaks volumes for the usefulness of the services rendered by the associations to industry generally in the present business situation.

Commenting on the need for maintaining strong trade associations to assist industry in meeting the problems arising out of the depression, Silas H. Strawn, president of the National Chamber, says:

"If ever trade associations were a good thing, they are doubly so now. Never was there a time when cooperation was so necessary, and when trade associations were more essential."

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Representatives in all the rubber centers of the United States, Canada, England, France, Germany and the Middle East.

The Rubber Industry's CURRENT NEWS

Financial—Personals—New Rubber Products—
Building Operations—Manufacturing—Exports

THINKS RUBBER DEMAND WILL EXCEED OUTPUT

That production of crude rubber during 1932 will fall approximately 30,000 tons below consumption is the prediction voiced in a statement by F. R. Henderson, former president of the Rubber Exchange of New York and now head of the crude rubber department of Clark, Childs & Keech, New York City.

While there is plenty of rubber in reserve now to take care of this production shortage, the statement points out, there has been a steady decline in production due to the continuous fall in the price.

"Unable to reach a basis for controlling native output, the British and Dutch governments abandoned the effort to control production, and rubber is now free of unnatural influence and the law of economics will rule.

"Manufacturers today have about 300,000 tons against a normal of 115,000 tons; there is afloat or en route 135,000 tons, against a normal of 115,000 tons; 40,000 tons on estates, against a normal of 55,000 tons, and 220,000 tons in the secondary trading markets, against a normal of 125,000 tons. The 30,000 tons at present in the primary trading markets are about normal. There is, therefore, 285,000 tons excess at present, and this is either in manufacturers' hands or dealers' hands in Europe and New York.

"The present low prices have attracted an unusually large stock to the important factories and trading centers. For the first time in rubber history, New York has an adequate cushion of stock to support healthy trading—2¾ cent rubber permits carrying a large stock at a minimum of finance."

Potential Production 1,000,000 Tons

The statement estimates the potential production for 1932 would be 1,000,000 tons if the price level justified full operations, which it does not. As it stands now, the influence will be only slightly reflected in the first six months, but the curtailment now taking place indicates a 1932 production of only about 670,000.

"World rubber production in 1931," the statement continues, "was divided about as follows: British Malaya (estate), 30 per cent; British Malaya (native), 23 per cent; Ceylon, 8 per cent; Dutch East Indies (estate), 20 per cent; Dutch East Indies (native), 13 per cent; all others, 6 per cent.

"The Dutch estates are being compelled to close down rather rapidly due to the foreign exchange situation. It must not be forgotten that maintenance of the gold standard by Holland operates adversely for the Dutch producer.

"The closing down of estates is a serious phase of the rubber situation. The main body of rubber labor is recruited and, once repatriated, considerable capital outlay is necessary for reopening. Closing down only takes place when reserves are depleted and new financing will only be possible when the price level is attractive. Present prices do not permit the production of a single ton of estate rubber except at an out-of-pocket loss."

Tax Law Raises Tire Prices

Practically all the tire manufacturing companies have prepared new price schedules, effective as of June 21, adjusting prices to the new tax law. The new prices show an increase around 11 per cent on casings and solid tires and 15 per cent on tubes.

The Firestone Tire and Rubber Company is reported to be holding its new price schedule in abeyance pending the movement of the mail order houses, but this seems to be the only one of the larger companies which has not definitely announced new price listings.

The policy of the mail order houses, as expressed by Sears, Roebuck and Company officials, is that tire prices will have to be determined in time for insertion in the next general catalog, which will be published in July, but no previous announcement is expected.

P. W. Litchfield, president of Goodyear Tire & Rubber Co., stated that while prices are being raised the new price is still appreciably below that of a year ago. He said he believed the increase should prove a stimulus to tire purchasing rather than the opposite since it gave definite indication to those car owners who have delayed making tire replacements on a falling price market that the bottom had been reached and that the trend was now upward.

Tire Dealers Plan Convention

Directors of the National Tire Dealers Assn. will meet in Chicago the latter part of June to make plans for the 13th annual convention of that Association which is to be held at Atlanta, November 14 to 16. This will be the first time that the tire dealers have gone so far south for their annual meet.

UNIQUE TIRE TEST BY U. S. RUBBER CO.

The average automobile tire of today gives 50 per cent more mileage than it did five years ago despite the fact that demand on tire performance has grown heavier each year, it is revealed in a recent survey by the United States Rubber Company.

One feature of the survey, which brought out how tremendously the demand on tire performance has increased, consisted in a comparison of 12 motor cars covering the entire price range of the present year with the same makes five years ago. The comparison revealed that the horsepower of the average car has increased 80 per cent and the weight 25 per cent, while a decrease of 20 per cent has taken place in the size of the wheels.

These changes, which mean more power, more weight, more speed, faster acceleration, and more wheel revolutions, all contribute to faster tread wear. Yet, in the face of the extra demand on quality, tires today give 50 per cent better service than they did in 1927.

Baldwin Operating at Peak

Increases in production releases by several large automobile companies have sent daily tonnage marks at the Baldwin Rubber Company, Pontiac, Mich., to higher figures than a year ago at this time. Since May 1 production at the factory has exceeded the same period of 1931.

Three eight-hour shifts a day are being run at the present time. The factory has 75 more men employed than it ever had, a total of 339 being employed in the factory.

Orders from Ford Motor Car Company and the various Chrysler plants are accounting for the increased production. Rubber floor matting, running boards and molded rubber pieces are made at the factory. S. C. Clark, president, said employment is at its peak now, and would continue at the high level for another two months, at least.

Goodrich-Miller Outing

Several hundred workers in the engineering and miscellaneous departments of the Goodrich and Miller plants at Akron staged their fourth annual golf tournament and picnic at Loyal Oak, Saturday afternoon, June 11.

A wide variety of other games, including barnyard golf, and other entertainments were enjoyed by those who do not play golf. C. T. Butler was general chairman in charge of the arrangements.

FIRESTONE TIRES IN BIG INDIANAPOLIS RACE

A graphic story of the remarkable part played by tires in the 500-mile international sweepstakes on the Indianapolis Motor Speedway, Decoration Day, was told by a recently issued statement by Firestone. It was the thirteenth consecutive triumph for Firestone in this great motor racing classic.

"There is no more severe test of automobile tires than that to which they were put at Indianapolis," said the statement.

"The cars darted along the straightaways at close to 150 miles an hour and swept into the embanked curves at an appalling pace. It was on these turns that the stress and strain was the hardest. As the cars dived into the turns, their momentum caused them to climb the embankment from the lower rim to the outer. This was an uncontrollable action by the car and it is called 'drifting.' In these perilous moments it was necestween the skill of man and the strength of sary that there be a perfect coordination besteel and rubber to avoid disaster.

"At these terrific speeds one would expect to find great holes burned in the tread and the rubber worn entirely away. But nothing of the sort happened. An inspection of Firestone tires after they had traveled the full 500 miles revealed an amazing state of preservation. Very little wear was discernable."

Falls at Record Capacity

The Falls Tire and Rubber Company plant of the Master Tire Corporation will break all past production records during the month of June, according to a statement by President R. P. Bemer.

The Falls plant, Mr. Bemer said, had broken its production record last month, but now has a sufficient backlog of unfilled orders to run on a full-time basis for the rest of this month. Production to fill orders only will be in excess of the May business, it was declared.

Mr. Bremer, in making his announcement, said that Master Tire plants, with their general offices at Akron, now are national in distribution, and that there has been a substantial increase in business since the beginning of the year.

Du Pont Buys Argentine Firm

E. I. du Pont de Nemours & Co., Inc., has acquired a controlling interest in C. G. Bartlett & Co., Ltd., of Buenos Aires, who have taken over Borzone & Marengo, manufacturers of carbon bisulphide. This company, under the name of E. I. du Pont de Nemours y Compania Argentina S. A. Commercial y Industrial, with headquarters in Buenos Aires, will carry on the present business of the two firms, the most important activities being the importation and processing of sulphur.

Goodrich to Take Inventory

Semi-annual inventory of B. F. Goodrich Company will be taken as of June 30, and all operating and manufacturing departments will close for the inventory on that date.

Fordlandia's First Shipment

The first export shipment of products from Fordlandia, the Brazilian plantation development of Henry Ford, was made to the United States on June 3, after four years of effort in laying out the plantation. No crude rubber was shipped as commercial production of rubber is not scheduled to start for some time. The shipment consisted of 900 feet of fine surfaced lumber and 50 tons of unplaned lumber, taken from the site of the plantation in the course of clearing for further rubber plantings.

Exchange Differentials

The adjustment committee of the Rubber Exchange of New York have fixed the June price differentials between the various grades of Hevea plantation rubber which shall prevail on all deliveries against the exchange. "A" and "AB", for the month of June, 1932, as follows:

No. 2 crepe (thick or thin) at 1 point; No. 2 ribbed smoked sheets at 6 points; No. 3 ribbed smoked sheets at 12 points; No. 4 ribbed smoked sheets at 24 points; No. 5 ribbed smoked sheets at 50 points. The limit of allowance on No. 2 crepe is 25 points. Allowance on rubber delivered in bales is 8 points.

Increases News Advertising

Announcement of substantially increased newspaper tire advertising in additional American markets was made recently by the B. F. Goodrich Company, Akron, O.

The new Goodrich campaign has already been released and will appear in newspapers in every city where the rubber company has sales representation.

Early this year Goodrich stated that its newspaper advertising appropriations had been doubled over 1931, and the latest increase will be made during the balance of this year.

Dayton Boosts Output

The Dayton Rubber Manufacturing Company, Dayton, O., report that the factory force is now working on three eight-hour shifts a day on a full week of seven days.

From orders on hand practically every tire in the warehouse has been sold, while demands being made upon the production schedule of the factory have necessitated the addition of many more men and all part time employes are now working on a full schedule.

Sales by older dealers are showing a marked increase and quite a number of distributors are ordering Dayton tires and tubes in carload quantities.

Goodyear Mills Shuts Down

Goodyear Mills, Inc., subsidiary of Goodyear Tire and Rubber Company has suspended production at its plant at Goodyear, Conn., which for the past eight years has operated continuously day and night, employing 500 workers.

MAY PURCHASE PLANT OF NORTHERN RUBBER

Rumors have been current that the plant and equipment of the old Northern Rubber Company, of Akron, O., which has been idle for the past two years, may be purchased and production resumed shortly, through the formation of a new company to manufacture tubes.

L. W. Rinear, with offices in the Bedford Building, Akron, is authority for the statement that property of the Northern Company may be taken over by the new organization of which he is associated.

He said that Edward A. Tinsman, formerly with the Portage Rubber Company, would be associated with him in the venture. The project, it was learned, involved negotiations with Attorney Harvey Crow of Massillon representing a group of bondholders owning control of the Northern Rubber Company property.

It has been proposed to take over the plant by raising capital in the form of building and loan certificates to be contributed by men who will be employed.

The company would manufacture inner tubes which would be marketed through mail orders, according to present plans.

Chemists Seek Jobs

The Chemical Unemployment Committee at 300 Madison Avenue, New York City, report that they have twenty-two unemployed chemists and chemical engineers registered, who have had one or more years of direct experience in the rubber industry. This experience includes the following classifications: Accelerators, analysis, brake lining, colloidal dispersion, design and construction, plantation, research, sales, tires, etc.

This presents an opportunity for the industry to obtain experienced, technically trained men that are not ordinarily available.

Since the first of the year the Committee has registered six hundred and thirty-two chemists and chemical engineers living within a fifty mile radius of New York City, and has found jobs for 125 of them.

Rubber Stock Quotattions

	Last Price		—1932—	
	June 30	June 6	High	Low
Aetna	1⅝	1⅝	3	1⅝
American Hard Rubber	—	—	—	—
Faultless	18½	—	25	12
Firestone	11¼	—	15	10⅝
do. 6% pfd.	46¾	47	59½	45½
Fisk	¼	⅛	⅜	⅛
do. 1st pfd.	⅜	—	⅞	¼
General	45	25	45	25
do. pfd.	60	—	—	—
Goodrich	2⅜	3	5⅝	2¼
do. pfd.	11	8¼	17	7
Goodyear	8¼	7⅞	18¾	5½
do. 1st pfd.	—	23¼	61	19¾
India	2	—	7	½
Kelly-Springfield	⅞	1	2⅞	½
do. 6% pfd.	30	18	30	16
Lee	2⅛	2⅛	2⅛	2
Mohawk	1¼	1	2½	1
do. pfd.	20	20	—	—
Norwalk	1	—	—	—
Pirelli	23	22¼	31¾	21
Raybestos-Manhattan	5	5¼	11½	4⅞
Seiberling	—	1	4½	1
do. pfd.	15	—	22	15
Thermoid	1⅜	1½	3	⅞
U. S. Rubber	2¼	2½	5⅜	1¼
do. pfd.	5	4½	11½	3¼

BRITISH RAINCOAT FIRM OPENS IRISH FACTORY

A waterproof garment factory in Dublin will shortly be opened by J. Mandelberg & Co., Ltd., the big Manchester rubber raincoat firm. The plans are almost complete and manufacturing will be commenced at an early date. A subsidiary company, which will be known as J. Mandelberg & Co. (Ireland), Ltd., is being formed with a capital (nominal) of £5,000 ($25,000).

The new import duties on clothing of all types imposed by the Irish Government has made it practically impossible for the firm to continue its export trade with the Free State. Hence the decision to manufacture in Dublin.

Rim Output Increases

Automobile rim production again increased last month following an upturn in the previous month, according to the May report of inspections and approvals issued by the Tire and Rim Association, Inc. The association's figures, moreover, do not include those of the Ford Motor Company, which for the past six weeks has been rapidly increasing activities.

The May increase in production is not large, being only 1.6 per cent greater than for April, probably indicating that the industry, not including Ford, is near a peak for the present. Inspections and approvals in May totaled 692,479 units, compared with 681,560 in April. In May last year output was 1,508,349. Last month's total represented only 43 per cent of this figure.

It is interesting to note that so-called "experimental" rims contributed to the gain in total output recorded last month, rims under this classification numbering 34,484. These experimental rims are made for the new low-pressure balloon tires, sometimes called "doughnut" tires. They first appeared in production statistics for April when 29,434 were reported. The May output represents a 17 per cent increase.

Colonial Rubber Closes

Colonial Rubber Company, Yardville, N. J., manufacturers of rubber specialties, has suspended operations after having conducted the factory for some time.

Dural Increases Output

Dural Rubber Corporation, Flemington, N. J., has experienced a business boom and has placed a number of extra hands at work. The plant is now operating with two shifts in order to fill orders for automobile inner tubes and swimming tubes.

Kelly-Springfield Cuts Prices

Following cuts in prices of cheaper lines of tires by both Montgomery-Ward and Sears-Roebuck early in June, Kelly-Springfield Tire Company announced reductions in its low-priced line. The Cruiser line is listed $3.49 for the 4.40x21 casing when bought in pairs, and prices for other sizes are correspondingly low.

Names in the News

F. A. SEIBERLING, president of the Seiberling Rubber Company, recently resigned the presidency of the board of Lincoln Memorial University, at Harrogate, Tenn., because of pressure of business, only to be elected honorary president.

H. W. DELZELL, manager of the technical service department of The B. F. Goodrich Company tire division, and M. G. HUNTINGTON, advertising manager of the Brunswick Tire Corp., Goodrich subsidiary, were in East St. Louis, Ill., Tuesday, June 7, to assist the Illinois Farm Supply Company in conducting a tire merchandising conference. They later went to Urbana, Galesburg and DeKalb for similar meetings.

C. P. HALL, president of C. P. Hall Company, Akron, Ohio, is spending several weeks in the Los Angeles office of his company calling on the Coast trade and breaking in a new representative to replace B. E. Dougherty, formerly in charge of that office.

Five B. F. Goodrich Company research scientists attended the summer meeting of the American Institute of Chemical Engineers at Schenectady and Corning, New York, June 15th to 17th. They were:

DR. WEBSTER N. JONES, general superintendent, processing division, who is a director in the American Institute; DR. H. L. TRUMBULL, GEORGE OENSLAGER, and ARTHUR OENSLAGER, chemical research laboratories, and ARTHUR CARPENTER, manager of testing laboratories.

ARTHUR O. RUSSELL, long associated with the Read Machinery Company, of York, Pa., in the manufacture and design of heavy duty mixers, has left the company and taken up the same work together with the sale of chemical machinery, for the Robinson Manufacturing Company, of Muncy, Pa. The severance of Mr. Russell's connection with the Read company was due solely to the present economic conditions.

W. H. KEPLINGER, B. F. Goodrich Company, chairman of the rubber group, National Retail Credit Association, addressed the 20th national convention of the Association in Washington, D. C., June 23. Mr. Keplinger's subject was, "A National User Looks at Credit Costs."

The Akron group, composed of credit men from the local rubber companies, was recently organized.

HENRY WACKER, B. F. Goodrich aeronautical sales department, attended the opening of the new Albany, N. Y., airport, Tuesday, June 7. The Albany port is said to be one of the finest in the country and the opening was marked with a flying show and the attendance of aeronautic leaders from all parts of the United States.

BRADLEY DEWEY, president of the Dewey and Almy Chemical Company, Cambridge, Mass., makers of the Darex sole, was prominent in Washington in the recent fight against the import tax proposal on crude rubber.

R. H. EAGLES, of J. M. Huber, Inc., New York City, left recently for England and the Continent, to be gone about two months. He will visit J. M. Huber, Ltd., in England and Huber agents on the Continent.

DR. WILLIAM C. GEER, former vice-president of B. F. Goodrich Company, has recovered from a short illness from which he suffered while recently visiting Akron, O., and has returned to his home in Ithaca, N. Y.

WILLIAM F. YOUNG, formerly aeronautical sales representative of B. F. Goodrich Company in California, arrived in Akron recently to act as secretary of the contest committee for the National Air Races to be held in Cleveland.

JEROME C. HUNSAKER, vice-president of the Goodyear-Zeppelin Corporation, has been elected a term member of the corporation of the Massachusetts Institute of Technology, to serve for five years.

B. J. LEMON, United States Rubber Company, spoke on June 16 before the summer meeting of the Society of Automotive Engineers, White Sulphur Springs, W. Va., on the subject of "Doughnut Tires."

C. EDWARD HYKE, formerly manager of the Western Rubber Company, Goshen, Ind., will assume the management of the Ohio Rubber Company, Willoughby, O., according to a recent announcement.

Members of the Rubber Manufacturers' Association of New Jersey on June 17 held their annual dinner and outing at the Trenton Country Club, Trenton, N. J. Concerns in Trenton and other parts of the state were represented at the gathering. The day was devoted to playing golf. JOHN A. LAMBERT, treasurer of the Acme Rubber Manufacturing Company, is president of the organization.

C. EDWARD MURRAY, JR., former president of the Murray Rubber Company, was one of the judges of shepherd dogs for the Greenwich Kennel Club, of Greenwich, Conn. Mr. Murray is the owner of the Willow Gate Kennels at Princeton, N. J.

DUNLOP BRINGS OUT NEW "DOUGHNUT" TIRE

After much hesitation and considerable experimentation the Dunlop Rubber Company, Ltd., have announced the introduction of a low pressure tire, which will be known to the trade as the "Dunlop Magna," and which follows in general the design and construction of the now familiar "doughnut" type.

The announcement from the Dunlop Company, regarding the introduction of the new tires, reads in part as follows:

"These new tires are fatter and softer than the well-known balloon tires of today, that is to say—they are of greater sectional width and contain a much greater volume of air at a lower pressure; this accounts for the description 'low pressure balloon tires.' The tire of this type which this company is producing, is referred to as the 'Dunlop Magna,' and this tire will give undoubted advantages in riding comfort compared with the ordinary tire in use at present.

"Two of our test cars equipped with 'Dunlop Magna' tires have proved to our satisfaction and to that of many British chassis manufacturers that the improvement in riding comfort is very noticeable, particularly where roads are bad. The road-holding properties and freedom from skidding are exceptionally good and there is a noticeable absence on long journeys of the jarring which at times makes motoring rather fatiguing.

Tire Improves Travel Comfort

"It is rather early to say what the developments are likely to be in this country, which has a road system unequalled elsewhere, but for overseas conditions, where roads are sometimes very bad, or non-existent, the new tire has greatly improved riding comfort, and, therefore, enables greater speed to be maintained over such surfaces.

"As was proved to be the case ten years ago, the first ideas of the size of the new tire were too ambitious. It has been shown that the very large section low pressure balloon tire is not practicable, and once again a compromise may have to be reached to give the maximum comfort consistent with easy steering, freedom from roll, and good car performance. While tires of the low pressure balloon class are obviously attractive from many points of view, it will be equally clear that their extended use involves certain problems for car and tire manufacturers alike. That these problems will disappear in due course may, we think, be already taken for granted, having regard to the close co-operation that obtains between car and tire designers in their common object of providing the best possible service to the public."

New Exchange Trading Rule

Members of The Rubber Exchange of New York, Inc., may transfer "No. 1 Standard" and "A" Contracts into the new "No. 1B Standard" and "AB" Contracts without commission charges to their principals, according to regulations just approved by the Board of Governors.

Such privileges are extended in the case of contracts made prior to June 1, 1932, and cannot be exercised beyond July 30, 1932. The transfer also must be made into a month corresponding with the delivery month specified in the older contract. The regulations also do not apply to other fixed charges, such as floor brokerage, clearance fees, taxes and the like.

Neptune Moves

Neptune Rubber Company, manufacturers of rubber bathing goods, is moving its plant from Irvington, N. J. to Eggerts Crossing, near Trenton. The plant will be in full operation here late in the summer.

Exchange on Saturdays

Members of the Rubber Exchange of New York, Inc., recently voted favorably on a proposal to close the exchange for trading on Saturdays during July and August and on September 3, 1932, the Saturday preceding Labor Day.

A day for balloting on the question had been appointed by the board of governors following receipt of a petition from members, requesting an opportunity to express themselves individually on such a proposal.

It was also voted to suspend, on the Saturdays in question, certain by-laws and rules, with respect to delivery and receipt of rubber.

British Stocks Decline Sharply

Stocks of rubber in London on June 18 totaled 52,636 tons, a decrease of 2,000 tons. Stocks at Liverpool came to 58,601 tons, a decrease of 950 tons. The combined decrease of 2,950 tons in London and Liverpool stocks is the sharpest which has occurred since the week ended May 14, when the combined drop was 4,075 tons. In the past four weeks British rubber stocks have declined approximately 8,000 tons.

The supplies of 111,237 tons now on hand at the two points compares with 127,222 tons on hand January 2, a decrease of 15,985 tons, and with 137,341 tons on June 20, 1931, a decrease of 26,104 tons.

Increases Mechanical Prices

Effective June 21, the B. F. Goodrich Company increased by 10 per cent prices of its entire mechanical rubber products line. This advance affects several thousand mechanical rubber products manufactured by the company.

Rubber Production Increased

Rubber production increased on both large and small estates in British Malaya during May, according to the Far Eastern Census for that month. The output on large estates was 19,915 tons, compared with 18,968 tons during April, and that estates less than 10 acres in size 14,079 tons, compared with 11,596.

During the same month last year, production on large estates amounted to 18,904 tons, and that on small estates, 15,399 tons.

Stocks of crude rubber remaining on estates at the end of May, totaled 21,339 tons, dry basis, against 20,730 tons during April, and 21,901 tons during May, 1931. Stocks in hands of Malayan dealers last month amounted to 24,083 tons, compared with 26,712 tons at the close of April, and with 18,393 held by dealers at end of May, 1931.

FIRESTONE EXPLAINS STAND ON TIRE PRICES

J. W. Thomas, president of the Firestone Tire and Rubber Company, has issued a statement in which he states that Firestone will not follow other large tire manufacturers in raising prices until such time as it can be done "on a sound and constructive basis." Mr. Thomas quoted newspaper advertisements by a large mail order house which stated that retail tire prices would not be increased after June 21 when the federal excise tax became effective.

"These advertisements," Mr. Thomas said, "were obviously designed to stop the sales by the independent dealers who advertised tax free tires before June 21 and to give notice to the public that the mail order house would not increase its prices to absorb the excise tax before July 21 and possibly not before August 21. This big mail order house is taking advantage of the fact that the excise tax on tires and tubes applies to the manufacturer and since the mail order house is merely the distributor of special brand tires made for it by a large manufacturer, it is evident that it has big stocks of tires tax free.

"Independent dealers also have large stocks of tires tax free and it would be foolhardy for the manufacturers to issue a new higher list price at this time and ask the tire dealers to sell their large stocks at these higher prices when the special brand distributor, their largest competitor, is advertising that he will not raise his prices.

"We emphasize that the Firestone company is ready and willing to raise its prices on the complete line of Firestone tires and tubes whenever that can be done on a sound and constructive basis. But to raise the list price on standard tires and thereby give the mail order houses a still greater advantage over independent tire dealers would further demoralize the industry and we cannot subscribe to that kind of program."

More Zepps Planned

Goodyear-Zeppelin Corporation will continue to build large airships for trans-Atlantic travel if the present bill which recently passed the House of Representatives will successfully go through the upper House.

With clearing of the legislative horizon for trans-oceanic airships Goodyear-Zeppelin officials faced the task of financing the huge project.

"It will cost about $14,000,000 to set up the American Atlantic line, build the terminal and the first ship," said President P. W. Litchfield.

"How quickly the project can be financed will depend naturally on general business recovery."

Nothing will be done, however, until the McNary bill is passed by the Senate, officials said.

New Rubber Brokers Merge

A new partnership to include members of the present Rubber Exchange firms of Clark, Childs and Company and F. B. Keech and Company, has been organized and will begin operation on July 1. It will be known as Clark, Childs & Keech.

Rubber News Around the World

"SINGATEX" ROADWAY PROCESS DEMONSTRATED

RECENTLY at the Rubber Research Institute, Kuala Lumpur, a group, including the British High Commissioner, witnessed a demonstration of the manner and means of paving roads and other surfaces with the "Singatex-Rubber Cement-Asphalt Paving Mixtures" and inspected various samples of pre-made tiles and blocks.

Veera Kumar Singhan, the inventor of these mixtures, carried out the demonstration and explained the various steps and the substances used in the process. After first inspecting the samples and hearing Mr. Singhan explain them and watching him making a mixture on the spot with his prevulcanized reversible latex paste, all adjourned to the terrace adjoining the Institute whereon a plot was laid out with a macadam surface for spreading over samples of such paving mixtures and on which some previous samples of mixtures made by the Institute were setting.

In the course of his explanations Mr. Singhan submitted that the only cheap form in which rubber can be incorporated with any road-surfacing material is as a prevulcanized reversible latex paste and the only cheap manner of obtaining such a paste is on the estate, by vulcanizing the latex with the addition of the Singhan vulcanization mixture to the latex and exposing it to solar or atmospheric heat evaporating the vulcanized latex in vacuum-evaporators or filtering it or creaming it.

Mr. Singhan further explained that he proposed to get the ultra-filter manufacturers in Germany to make special filters of larger size than the current laboratory specimens, while there might be another possible method of chemico-mechanical creaming which he had communicated to the Director and which was not patented.

As regards the mixture, he said that a rubber-cement mixture, though satisfactory in every other respect, cost at present about 50 cents per square foot.

Mr. Singhan said that his rubber-asphalt paving cost 80-90 cents per gallon for the mix and with the fillers added a square yard of the road can be laid for $2.50.

NORTH BRITISH RUBBER GAINS OVER 1930 LOSS

The North British Rubber Company, Ltd., was hard hit by the fall in rubber and cotton prices in 1930, and also had to face a marked increase in competition for the reduced trade available, with the result that many of the company's lines were sold at less than cost. These difficulties became even more pronounced in 1931, so that shareholders hardly expected that the accounts would show a profit; but, in fact, the results now disclosed are a decided improvement upon those of the previous year.

The trading loss, according to an analysis of *The Financial News, London,* after providing a slightly smaller sum for depreciation, is reduced from £79,817 to £44,403, before taking credit for £17,356 of tax reserve no longer required. The company cut its losses on stocks and on forward contracts last year by providing £68,000 for writing-down, and apparently any further writing-down required this year has been charged in the loss of £44,403. Largely as the result of the absence of a further charge, the total debit has been reduced from £168,425 to £65,023; and whereas last year's loss (and the payment of a half-year's dividend on the Preference shares) involved a draft of £170,000 on reserve and a reduction of the carry-forward by about £4,000, this year the reserve is untouched, except for the appropriation of the tax allocation.

The carry-forward, however, is converted from a credit of £23,102 into a debit of £24,564. The balance-sheet naturally shows a further contraction of cash assets (bills, cash and advances to subsidiaries), but debtors have increased; and, on the whole, there has been no further weakening of the liquid position, thanks to a reduction of stocks from £462,399 to £415,160. External liabilities have in the aggregate fallen by some £24,000, and the balance of the Trade Facilities Loan has been repaid.

Biggest British Tire

An enormous balloon tire, size 15.00-20, weighing well over a quarter of a ton and containing 30 miles of supertwist cord, is now being manufactured by the Goodyear Tire and Rubber Company (Great Britain), Ltd., at Wolverhampton. The new tire is the largest ever made in the United Kingdom and can be used only on the largest vehicles It has a sectional diameter of 16.38 inches and an over-all diameter of more than four feet. Its assembly weight is 563 lbs. It can easily support a load of 10,500 lbs.

Rubber Covered Dish Drainers

Research scientists in rubber circles are constantly developing new products which add to the conveniences of modern life, among the latest of which are Anode rubber covered dish drainers manufactured by the Miller Rubber Products Company, Inc., division of The B. F. Goodrich Company, Akron, Ohio.

Use of the new Anode rubber covered dish drainers will prevent breaking, chipping and scratching of dishes, scratching and marring of kitchen sinks and is a great aid to elimination of noise. The rubber covering is green to match with other kitchen-green utensils.

Idea of extending the use of rubber to this field came from the application of Anode rubber to dish drainers in General Electric and Conover dish washers.

JAPANESE RUBBER FIRMS PLAN MERGER OF ESTATES

Japanese rubber growers in the Far East plan establishing a merger company, according to *The Japan Chronicle.* Much difficulty, however, is anticipated in materializing the scheme.

Hit by world overproduction and the acute business depression, these rubber growers have been experiencing great difficulties in carrying on their business on a paying basis. Many firms, as a matter of fact, are suffering much loss.

Mr. Yamaji, president of the Sumatra Rubber Company, is to discuss the matter with the Department of Overseas Affairs, the Toyo Development Company and the Bank of Japan, and obtain their support. The new merger company will be established with the South Seas Plantation Association as the nucleus. Such firms as the Sumatra Rubber, the Tropical Industry, the South Africa Trading, the Malay Rubber and the South Seas Rubber will be invited to participate.

Output of Malayan Smallholders

Although the wintering season this year lasted longer than last, the striking reduction in Malayan native production in March is significant. Most local firms do not believe the drop will continue to be so heavy as in March but there is general agreement that the decline for the year will be marked. The consensus of local opinion is that Malayan natives will produce between 150,000 and 160,000 tons this year. Local contacts say there seems to be a tendency on the part of the larger small holders to stop tapping with hired coolies, and perhaps this is because they are unable to pay wages, so tappers are at present finding it more profitable to grow pineapples.

Eastern Stocks Decrease

Dealers stocks of crude rubber in Malaya amounted to 42,563 tons at the end of May, as compared with 44,571 tons at the end of April. One year ago these same stocks amounted to 40,069 tons.

The total for May included 28,140 tons of smoked sheet, 1,842 tons of unsmoked sheet, 1,643 tons of scrap and lump, and 10,938 tons of crepe rubber.

"Harbor Board" rubber, or mostly rubber awaiting shipment, amounted to 4,974 tons at the end of last month against 4,234 tons at the close of April.

Estate Output in Br. Borneo

Statistics covering 26 estates in British Borneo during the first four months of 1932 show a production of 1,372 tons, a reduction of 12.5 per cent from 1931, which was in turn a reduction of 14.2 per cent from 1930. Estate production in British Borneo has declined gradually but rather steadily.

Why Golf Balls Go Far

That the measured speed of a driver when it connects with a golf ball is from 70 to 125 miles per hour was shown in the research laboratory of the General Electric Company when a series of tests was conducted by means of a device utilizing the photo-tube, or "electric eye." Jim Reynolds of Schenectady, winner of the national driving championship at Chicago in 1930, made the mark of 125 in his second attempt. The device used in the laboratory to obtain the speed of the club was developed by H. W. Lord, vacuum tube engineer. It employs two photoelectric beams and can be used to measure speeds which have never before been measurable because of the nature of their force.

Reynolds, who has a reputation for obtaining remarkable distance in driving, in his first attempt registered a speed of 106. His second swing was 125, the high mark of the afternoon, while other attempts ran from a low of 72 to 102 miles per hour, varying with the length of club used.

Alex McIntyre, professional of the Edison Country Club, Schenectady, also swung a driver several times from the platform. His speed when connecting with the practice ball ranged from a low of 70 to a high of 97 miles per hour. The tests demonstrated that lightness rather than weight in the head of the club, and length of shaft contributed to the higher rates of speed.

The apparatus developed by Lord for making the measurements includes two phototubes and light sources which effect two beams of light about six inches apart. These beams run at righ tangles to the path of the club, which is swung from a platform. The driver cuts the first beam a split second before it strikes the ball on its tee and almost immediately afterwards cuts the second beam. Both phototubes operate Thyratron tubes, the first one causing a condenser to begin charging and the second one stopping it. The resulting voltage charge across the condenser is measured by a meter, which is calibrated in terms of miles per hour. The calibration can be altered to measure much slower or much faster speeds.

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LATE MARKET PRICES

RUBBER—COTTONS AND FABRICS—CHEMICALS

NEW YORK, JUNE 20, 1932

Crude Rubber

NO change in buying interest and a continuation in the unfavorable statistical position of crude rubber have prevailed to keep prices on the market steady at around 2¾ cents per pound. A slight rise was recorded in the middle of the month on strength of the report of the May consumption, which showed a slight increase over April, but manufacturers' interest was lacking and the price level receded again. As long as visible stocks within the country remain at present figures and continue to be reinforced by a steadily maintained import tonnage there is little hope for any improvement in prices. Interest on the Exchange in New York remained dull over the fortnight.

Prices as of June 20, on the outside market follow:

Plantations—			
Ribbed Smoked Sheets—			
Spot June	.02⅝	@	.02¾
July	.02⅝	@	.02¾
Aug.-Sept.	—	@	.02¾
First Latex, crepe spot	—	@	.03½
Amber Crepe, No. 2	—	@	.02⅝
Amber Crepe, No. 3	—	@	.02⅝
Amber Crepe, No. 4	—	@	.02½
Brown Crepe, Clean thin	—	@	.02⅝
Brown Crepe, rolled	.02¼	@	.02⅝
Latex—			
Liquid Latex, per gal.	.70	@	.75
Paras—			
Up-river, fine	—	@	.05½
Up-river, coarse	Nominal		
Acre, Bolivian, fine	—	@	.06
Caucho Ball, Upper	—	@	.03
Centrals—			
Central scrap	.04	@	—
Esmeraldas	.04	@	—
Balata—			
Block, Ciudad	—	@	.18

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers

June	1 11/16	@	1¾d
Oct.-Nov.	1⅞	@	1 15/16d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers

Spot	———	@	1½d

Reclaimed Rubber

No change in the general prices of standard grades of reclaimed have been reported during the past two weeks, despite the prevailing low levels of crude rubber. Manufacturers of reclaim state that their prices are already down to rock bottom. Production fell off sharply in April but this was reported to be due largely to considerable stocks already on hand. Late quotations follow:

High Tensile				
High Tensile Red	lb.	.04¾	@	.05
Super-Reclaim Black	lb.	.05	@	.05¼
Shoe				
Washed	lb.	.05½	@	.05¾
Tube				
No. 1 (Floating)	lb.	—	@	.06½
No. 2 (Compounded)	lb.	.04½	@	.04¾
Tires				
Black	lb.	.03¾	@	.04
Black, selected tires	lb.	.04	@	.04¼
Dark Gray		.05	@	.05¼
Light Gray	lb.	.05½	@	.06
White	lb.	.05½	@	.05¾
Truck, Heavy Gravity	lb.	.05	@	.05¼
Truck, Light Gravity	lb.	.05¼	@	.05½
Miscellaneous				
Mechanical blends	lb.	.03	@	.03½

Scrap Rubber

Scrap prices have touched new low levels, making it still further difficult to accumulate stocks. Due to curtailment in reclaimed production demand has also declined, the larger rubber manufacturing companies with reclaiming facilities being the chief purchasers. New prices are as follows:

(Prices to Consumer)

Auto tire peelings	ton	17.00	@	18.00
Mixed auto	ton	6.50	@	8.00
Bicycle tires	ton	5.00	@	6.00
Clean solid truck tires	ton	20.00	@	22.00
Boots and shoes	ton	15.00	@	17.50
Arctics, untrimmed	ton	10.00	@	12.50
Inner tubes, No. 1	lb.	.02¼	@	.02½
Inner tubes, No. 2, compounded	lb.	0.1¼	@	.01¾
Inner Tubes, Red	lb.	.01⅝	@	.01¾
Air Brake Hose	ton	8.00	@	8.50
Rubber Hose	ton	7.00	@	8.00

Cotton

COTTON has registered new lows since the last fortnight report and seems to be inclined to be steady at around present prices. Crop reports continue favorable but without buying interest the market remains overloaded. Curtailment in cloth mill production is also contributing to keep the price level at the present low point.

High, low and closing prices on the New York Cotton Exchange, as of June 20, were as follows:

	June 20			June 6
	High	Low	Close	Close
June	——	——	5.16	5.04n
July	5.22	5.12	5.19	5.12
Oct.	5.45	5.38	5.43	5.30
Dec.	5.60	5.53	5.58	5.49

(n) Nominal.

Tire Fabrics

Prices on practically all grades of tire fabrics dropped to new low quotations during the last two weeks. The decline was expected and reflected the general drop in raw cotton during the past few weeks. Dealers report little interest even at the present attractive levels, however. Late quotations on standard constructions follow:

(Prices Net at the Mill)

CORD				
Peeler, carded, 23/4/3	lb.	.21¾	@	.22
Peeler, carded 23/5/3	lb.	.20¾	@	.21
Peeler, carded, 13/3/3	lb.	.17¾	@	.18
Peeler, carded, 15/3/3	lb.	.18¾	@	.19
Egyptian, carded, 23/5/3	lb.	.31¾	@	.32
Egyptian, combed, 23/5/3	lb.	.36¾	@	.37
CHAFERS				
Carded, American, 8 oz.	lb.	.16½	@	.17
Carded, American, 10 oz.	lb.	.16½	@	.17
Carded, American, 12 oz.	lb.	.16½	@	.17
Carded, American, 14 oz.	lb.	.16	@	.16½
LENO BREAKER				
Carded, American, 8¼ oz.	lb.	.17	@	.20
Carded, American, 10¼ oz.	lb.	.17	@	.20
SQUARE WOVEN				
Carded, American, 17¼ oz. 23-11 ply	lb.	.20½	@	.21½
Carded, American, 17¼ oz. 10 ply	lb.	.16	@	.16½

Sheetings

Some demand in sheetings has stimulated the market and caused fractional advances in 40-inch stocks but for the most part there has been little change in the market. Quotations follow:

40 inch, 2.50 yard	yd.	.04½	@	.04⅝
40 inch, 2.85 yard	yd.	.03⅞	@	.04
40 inch, 3.15 yard	yd.	—	@	.05
40 inch, 3.60 yard	yd.	—	@	.04
40 inch, 3.75 yard	yd.	.03½	@	.03⅝
40 inch, 4.25 yard	yd.	.03	@	.03⅛

Ducks

No change in duck quotations has been reported during the last two weeks. Prices are listed as follows:

Enameling	lb.	.16¾	@	.17¾
Belting and Hose	lb.	.18	@	.18½
Single filling	lb.	.07	@	.07¼
Double filling	lb.	—	@	.09¼

Closing Prices on Rubber Exchange of New York, Inc.

No. 1 Standard Contract of 10 Tons

FROM JUNE 7 TO JUNE 20, 1932

Date	Spot	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sales
June 7	2.68	2.62	2.65	2.70	2.75	2.80	2.86	2.92	2.98	3.04	3.10	3.16	25
8	2.65	2.60	2.63	2.68	2.72	2.78	2.84	2.90	2.95	3.00	3.06	3.11	14
9	2.62	2.56	2.59	2.63	2.68	2.73	2.79	2.85	2.91	2.97	3.03	3.08	41
10	2.60	2.56	2.59	2.63	2.68	2.73	2.78	2.83	2.90	2.98	3.05	3.10	166
11	2.64	2.60	2.63	2.67	2.72	2.77	2.82	2.87	2.94	3.01	3.08	3.13	125
13	2.72	2.65	2.68	2.72	2.77	2.82	2.87	2.92	2.99	3.06	3.13	3.18	26
14	2.70	2.63	2.66	2.72	2.75	2.81	2.86	2.91	2.97	3.04	3.11	3.16	32
15	2.75	2.68	2.71	2.75	2.80	2.85	2.90	2.95	3.02	3.08	3.15	3.20	87
16	2.75	2.62	2.65	2.70	2.75	2.74	2.83	2.91	2.93	3.02	3.12	3.17	28
17	2.71	2.64	2.67	2.71	2.75	2.77	2.83	2.90	2.95	3.02	3.08	3.14	53
18	2.69	2.62	2.65	2.70	2.75	2.81	2.87	2.93	2.97	3.02	3.06	3.12	12
20	2.70	2.63	2.66	2.71	2.76	2.80	2.85	2.90	2.97	3.03	3.10	3.16	37

CHEMICALS

NO particular increase in demand for rubber chemicals and compounding materials has been forthcoming from rubber manufacturers during the past fortnight and buying still is confined to immediate requirements. The general level of chemical prices continues low and no changes in prices on specific products have been reported during the last two weeks. Latest quotations follow:

ACCELERATORS

Organic			
A-1	lb.	.24 @	.27
A-5-10	lb.	.33 @	.36
A-7	lb.	.55 @	.59
A-11	lb.	.62 @	.66
A-16	lb.	.57 @	.61
A-19	lb.	.58 @	.62
A-20	lb.	.64 @	.68
A-32	lb.	.80 @	.95
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.		
Captax	lb		
Cryiene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.42 @	.44½
Diphenylguanidine	lb.	.30 @	.32½
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½@	.40
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.58½@	.61
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.37½@	.40
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R & H 397	lb.	.75 @	.76
R-2	lb.	1.95 @	2.15
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Tensilac, No. 39	lb.	.40 @	.42½
Tensilac, No. 41	lb.	.50 @	.52½
Thermio F	lb.	.50 @	.55
Thiocarbanilid, drums	lb.	.20 @	.22
TMTT	lb.	3.00 @	3.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.75 @	1.00
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.50 @	.60
Zimate	lb.		
Inorganic			
Lead, sublimed blue	lb.	.08¼@	—
Lead, white	lb.	.08½@	.08¾
Litharge, domestic	lb.	.06¼@	.07
Magnesia, calcined, light	per 100 lb.	5.35 @	5.45
heavy	per 100 lb.	3.65 @	3.75

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.35 @	.36
Ultramarine	lb.	.06 @	.32
Browns			
Sienna, Italian	lb.	.05½@	.12½
Umber, Turkey	lb.	.04½@	.07
Greens			
Chrome, light	lb.	.30 @	.32
medium	lb.	.31 @	.33
dark	lb.	.34 @	.36
Chromium Oxide, bbl.	lb.	.34½@	.35½
Reds			
Antimony crimson, 15/17	lb.	.40 @	.44
sulfur, free	lb.	.56 @	.66
golden, 15/17 F.S.	lb.	.20 @	.25
Indian English	lb.	.08 @	.11
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.08¾@	—
Whites			
Lithopone, Albalith	lb.	.04½@	.04¾
Lithopone, Azolith	lb.	.04½@	.04¾
Titanium oxide	lb.	.21 @	—
Titanox B	lb.	.06½@	.07
Titanox C	lb.	.06½@	.07
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.05¾@	.06
ZZ (leaded)	lb.	.05½@	.05¾
Horsehead Lead Free Brand:			
Selected	lb.	.05¾@	.06
Special	lb.	.05¾@	.06
XX Red	lb.	.05¾@	.06
XX	lb.	.05¾@	.06
XX Green	lb.	.05¾@	.06
Leaded Brand, Standard	lb.	.05½@	.05¾
Sterling	lb.	.05½@	.05¾
Superior	lb.	.05½@	.05¾
Lehigh	lb.	.05¼@	.05½
U. S. P., bbls.	lb.	— @	.12¾
Kadox, black label	lb.	.09⅝@	.09⅞
Blue label	lb.	.08⅝@	.08⅞
Red label	lb.	.07¼@	.07½
Cryptone, No. 19	lb.	.06½@	.06¾
Cryptone CB, No. 21	lb.	.06½@	.06¾
XX Zinc Sulphide, bbls.	lb.	— @	.13
St. Joe, black label	lb.	.05¾@	.06
green label	lb.	.05¾@	.06
red label	lb.	.05¾@	.06
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.05¾@	.06
Anaconda, selected lead free	lb.	.06¼@	.06½
Florence White seal, bbls.	lb.	— @	.10⅞
Green seal	lb.	.09⅝@	.09⅞
Red seal	lb.	.08⅝@	.08⅞
Yellows			
Chrome	lb.	.16½@	.17
Ocher, domestic	lb.	.01⅝@	.02

BLACKS

Arrow "Aerfloted"			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
Arrow "Aerfloted" Specification, c.l. f.o.b. wks., bags	lb.	.03 @	—
Bone, powdered	lb.	.05½@	.12½
Carbon, compressed	lb.	.02¾@	.07
uncompressed	lb.	.02¾@	.07
"Certified," Cabot			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
"Disperso" f.o.b. La.	lb.	.028 @	.071
f.o.b. Texas	lb.	.02¾@	.07
Drop, bbls.	lb.	.05½@	.14
"Excello," compressed	lb.	.03 @	—
"Fumonex"	lb.	.02½@	.06
"Gastex"	lb.	.02½@	.06
Lampblack	lb.	.07 @	.10
"Micronex"			
c.l. f.o.b. works, bags	lb.	.03 @	—
c.l. f.o.b. works, cases	lb.	.04½@	—
less c.l. f.o.b. works	lb.	.05½@	.07
"Supreme"	lb.	.02¾@	—
Thermatomic—"P 33"	lb.	—	—
"Thermax"	lb.	—	—
United, "Dixie" and "Kosmos"			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
"Velvetex"	lb.	.02 @	.05

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½@	.12
Asbestine	ton	13.40 @	14.00
Barium carbonate	ton	56.50 @	57.00
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	12.00 @	18.00
Western prime white	ton	33.00 @	—
Basofor	lb.	.04½@	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	75.00 @	90.00
Carrara filler	lb.	.01¾@	.02
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00 @	70.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	8.00 @	9.00
Aerfloted, Suprex	ton	6.50 @	8.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Langford	ton		
Lexington	ton	10.00 @	22.00
Par	ton		
Tensulite		15.00 @	—
Glues, extra white	lb.	.20 @	.25
medium white	lb.	.16 @	.20
Kalite No. 1	ton	30.00 @	60.00
Kalite No. 2	ton	40.00 @	70.00
Magnesia, carbonate	lb.	.08¾@	.11
Mica	lb.	.04½@	—
Rotten Stone (powdered)	lb.	.02 @	.05
Soapstone, powdered	ton	15.00 @	22.00
Starch, powdered	cwt.	— @	2.57
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	cwt.	.85 @	1.00
English cliffstone	cwt.	1.50 @	1.70
Sussex	ton		
Witco	ton	20.00 @	—
Zinc Carbonate	lb.	.09½@	.10½
Zinc Stearate	lb.	.18½@	.22

MINERAL RUBBER

Genasco (factory	ton	40.00 @	42.00
Granulated M. R.	ton		
Hard Hydrocarbon	ton		
Parmr, solid	ton	28.00 @	48.00
Pioneer, MR, solid	ton	40.00 @	42.00
Pioneer-granulated	ton	50.00 @	52.00
R & H Hydro-Carbon	ton	27.05 @	29.00

SOFTENERS

Acids			
Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66 degrees	cwt.	1.60 @	1.95
Tartaric, crystals	lb.	— @	.26½
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.13 @	.17
Stearic, double pressed	lb.	.17 @	.22
Alkalies			
Caustic soda, 76%	cwt.	2.90 @	—
Soda ash, 58% C.L.	cwt.	1.17½@	—
Oils			
Corn, refined, bbls.	lb.	.07 @	.08¾
Cottonseed, crude		— @	.04½
Cycline	gal.	.27 @	.34
Degras (c.l. 100 bbls.)	lb.	.03¾@	—
Less c.l. (10-25 bbls.)	lb.	.04 @	—
Lots less than 10 bbls.	lb.	.04¼@	.04½
Fluxrite	lb.	.05½@	.06½
Palm Lagos	lb.	.04 @	.05
Niger	lb.	.03½@	.04
Para-Flux	gal.	.17 @	—
Petrolatum, white	lb.	.08 @	.08½
Pigmentaroil	gal.	.18 @	.23
Pine, steam distilled	gal.	.54 @	.61
destructively distilled	gal.	.54 @	.55
Witco Palm Oil	lb.	.07½@	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06½@	.07½
coal tar	gal.	.05½@	.06
pine, 200 lb. gr. wt.	bbl.	7.00 @	—
Rosin, grade K, 280 lb.	bbl.	— @	4.60
Pigmentar	gal.	.18 @	.23
Tar Retort, 50 gal.	bbl.	13.50 @	15.00
Solvents			
Acetone, pure	lb.	— @	.10
Alcohol, denatured, No. 1 bbls.	gal.	.28 @	.29
Benzol, 90%	gal.	.20 @	.21
Carbon, bisulfide	lb.	.05½@	.06⅛
Carbon, tetrachloride	lb.	.06¼@	.07
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.28
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	— @	.37¼
wood	gal.	— @	.40
destructively distilled	gal.	.35 @	—
Waxes			
Beeswax, white	lb.	.34 @	.36
Carnauba	lb.	.26 @	.28
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.06½@	.07
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02½@	—
White crude scale 124/126	lb.	.02½@	—
Refned, 125/127	lb.	.03⅝@	—
Refined, 128/130	lb.	.03¾@	—
Refined, 135/137	lb.	.05¼@	—
Refined, 138/140	lb.	.07¼@	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Neozone	lb.		
Oxynone	lb.	.68 @	.80
Resistox	lb.	.54 @	.57
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.66

SPECIALTIES

Aromatics- Rodo	lb.		
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.30
Tonox	lb.	.56 @	.60

SUBSTITUTES

Black	lb.	.07 @	.09
White	lb.	.08 @	.14
Brown	lb.	.07 @	.11

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03½@	.04½
Sulfur flour,			
Ref'n'd, 100% pure (bags)	cwt.	2.40 @	2.75
Commercial (bags	cwt.	1.75 @	2.10
Telloy	lb.		
Vandex	lb.		

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269—light
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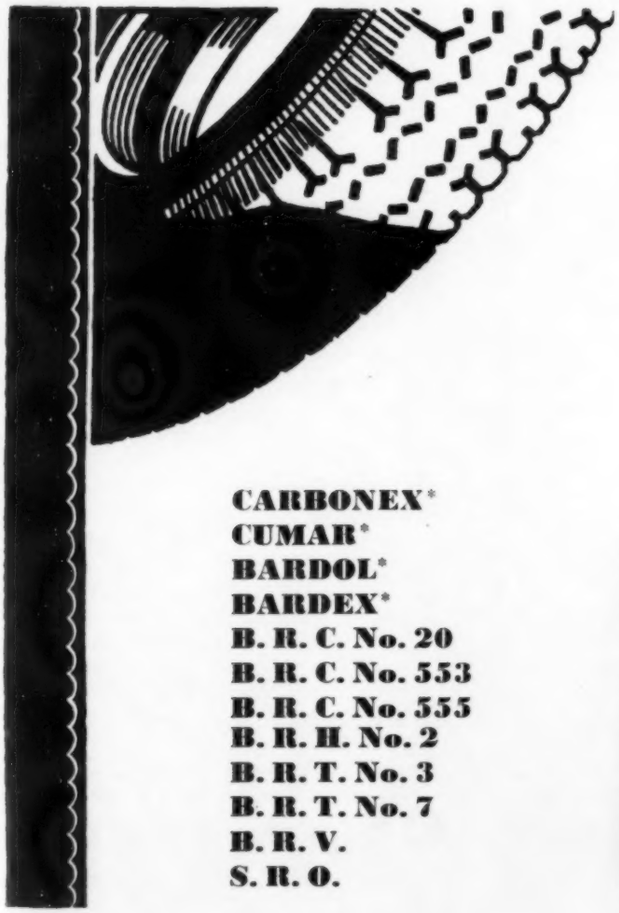

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